MINISTRY OF THE ENVIRONMENT OF THE SLOVAK REPUBLIC

STATE OF THE ENVIRONMENT REPORT

SLOVAK REPUBLIC 2006

Aiming to the sustainable development, it is important to ***create a balance between various activities of the society,*** *social-economical development and loading limit of the environment or particular elements of environment respectively, while respecting the self-renewable capacities of natural resources.*

National Environmental Action Programme II, adopted by the Slovak Government Decree No. 1 112/1999

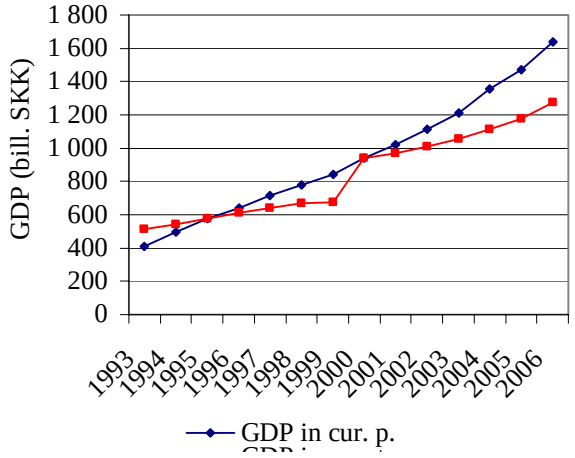
STATE OF THE ENVIRONMENT - CAUSES AND CONSEQUENCES

• ECONOMIC SECTORS AND THEIR IMPACT ON ENVIRONMENT

Economy trend in the SR

Slovak economy continued to grow also in 2006, accompanied by an increased employment rate. In 2006, gross domestic product (GDP) at current prices was 1 636.2 bill. SKK and in reality increased by 8.3 %, compared to the previous year. It was the greatest real year to year increment in the history of Slovakia, as well as the highest real GDP growth in the given year among the OECD countries, and the third highest among EU-27 (higher growth recorded only Latvia and Estonia).

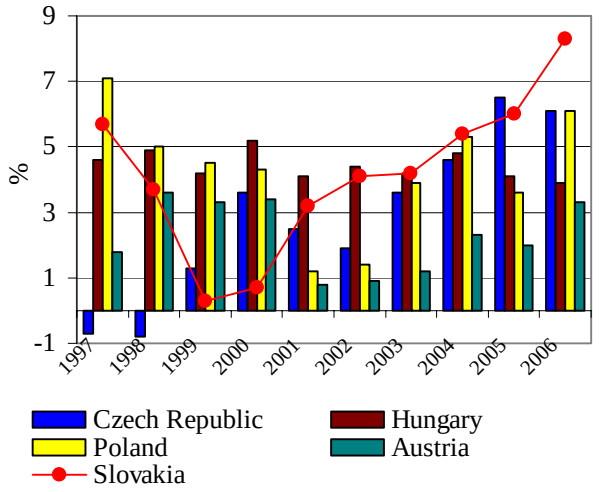
Trends in gross domestic product in SR*



* till 1999 at const. p. of 1995, from 2000 at const. p. of 2000

Source: SO SR

Growth rate of the real GDP (romr* = 100)



romr = same time period last year

Source: SO SR

GDP per capita in the SR at the purchase power parity (PPP) in 1999 was 48.1 % of the EU-25 average, and its share in 2006 increased to 59.7 %. Greatest regional share of GDP per capita at PPP in 2004 was recorded in the Bratislava region, with the share of 129.3 % of EU-27.

Limited size of domestic market qualifies Slovakia for an intensive cooperation with other countries of the world and for involvement in international trade. More rapid growth of import and export over GDP growth has lead to the increased openness of economy. **Export of goods and services** in 2006 at current prices reached 1 400 bill. SKK and in comparison to the previous year, export of goods and services was accelerated by 23.9 %. **Import of goods and services** in 2006 at current prices reached 1 471.9 bill. SKK and grew by 23 % on the year-to-year basis. In 2006, total export of goods and services to the EU-25 countries was 85.1% of all Slovakia's export.

In 2006, **foreign direct investments (FDI)** to the SR economy were 31.724 bill. SKK, and by the end of 2006, the cumulative volume of foreign direct investments in the SR was 475.9 bill. SKK.

Industry

- **Share of manufacturing in GDP generation**

Pursuant to the Branch classification of economic activities, there are three basic groups involved in industry: **C** - Mining and quarrying, **D** – Manufacturing and **E –** Electricity, gas and water production and distribution.

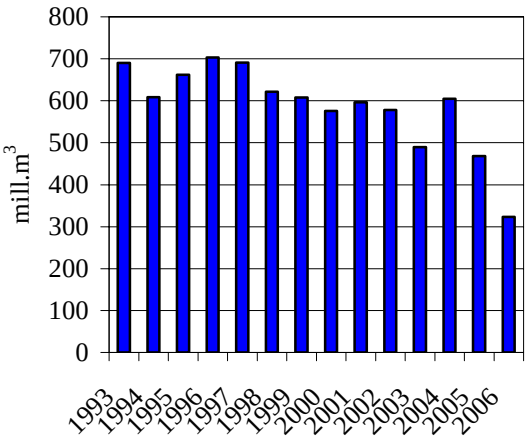
Industry has strengthened its position in the Slovak economy, increasing its **share on GDP generation** in 2006 to 34.1 %. Within the industrial sector, manufacturing production was 87.9 % of the generated GDP, production and distribution of electricity, gas, and water was 11 %, and mineral exploitation was 1.1 %.

- **Demand of industrial production on the exploitation of resources**

Compared to other EU countries, energy demand of the Slovak industry is very high. In 2004, share of industry on total energy consumption in Slovakia reached 41 % (in the EU-25 countries it was 28 %).

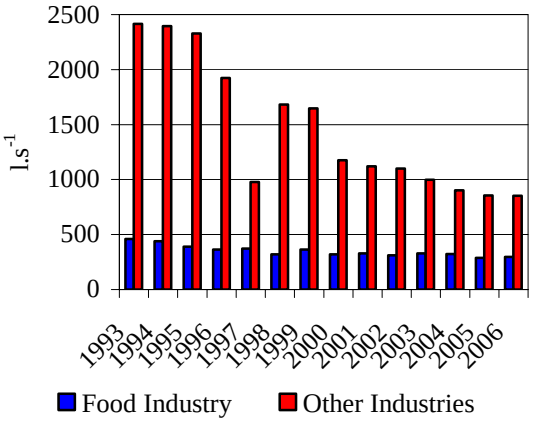
Since 1993, **surface water abstraction** by industry shows a falling tendency. In 2006, surface water abstraction by industry dropped by 53.1 %, compared to 1993. During the year 2006, as much as 81.9 % of total abstractions were industrial. Trends in **underground water abstraction** by industry show analogical tendency.

Development in consumption of surface water in industry



Source: SHMI

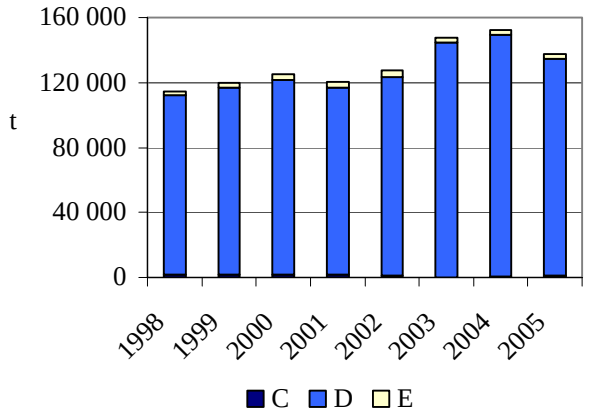
Advancement in underground water consumption in industry



Source: SHMI

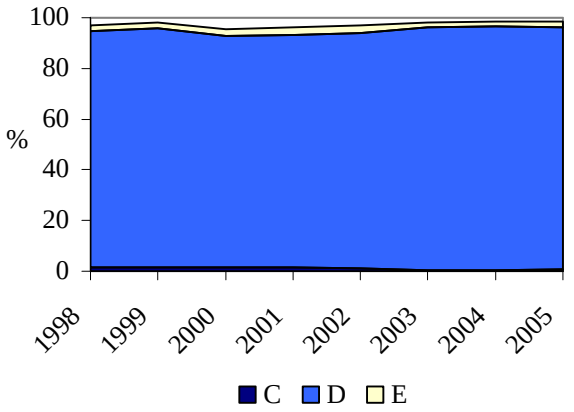
CO emissions from industry in 2005 made up as much as 98.4 % of large-size and middle-size stationary sources and emissions **increased** by 19.6 %, compared to 1998. **SO_2 emissions** from industry in 2005 made up as much as 99.2 % of large-size and middle-size stationary sources and emissions **decreased** by 45.5 %, compared to 1998.

CO emissions trend from stationary industrial sources



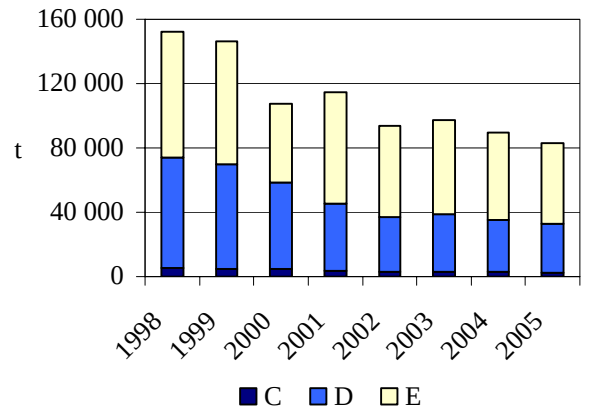
Source: SHMI

Share of CO emissions from stationary industrial sources on the overall CO emissions



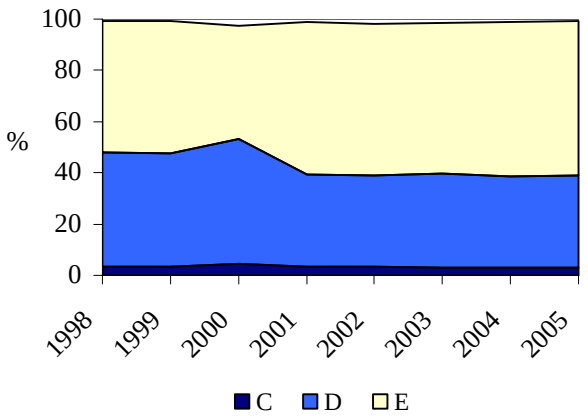
Source: SHMI

SO_2 emissions trend from stationary industrial sources



Source: SHMI

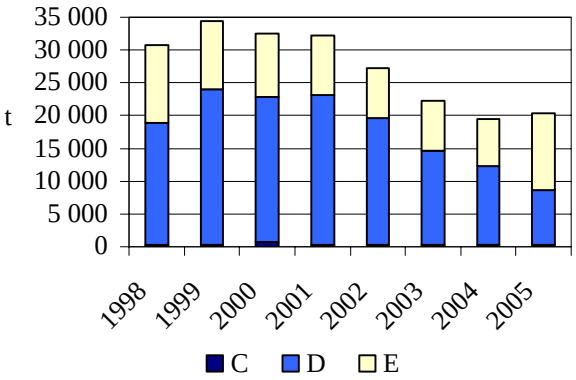
Share of the SO_2 emissions from stationary industrial sources on the overall SO_2 emissions



Source: SHMI

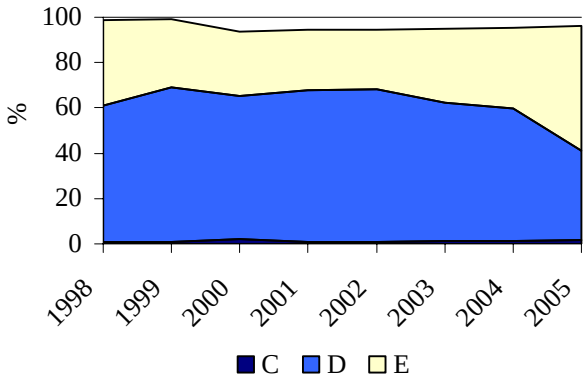
NO_x emissions from industry in 2005 made up as much as 96.3 % of large-size and middle-size stationary sources and emissions **decreased** by 34.4 %, compared to 1998. **SPM emissions** from industry in 2005 made up as much as 96.3 % of large-size and middle-size stationary sources, and emissions **decreased** by 33.9 %, compared to 1998.

SPM emission trend from stationary industrial sources



Source: SHMI

Share of the SPM emissions from station industrial sources on the overall SPM emissions

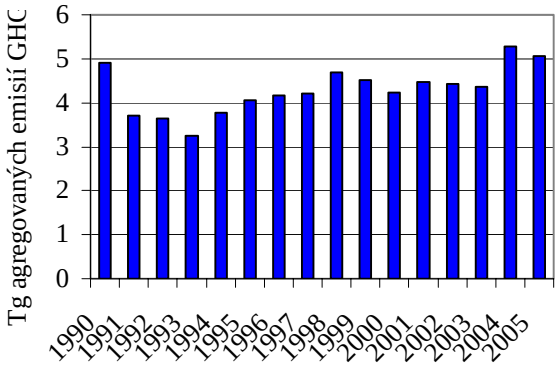


Source: SHMI

Heavy metal emissions by industry have had a decreasing tendency since 1990. However, in 2005 there was an increase in the Pd, Cd, As, Cu and Zn emissions from incineration processes in industry, as well as in the Hg and Cu emissions from industrial technologies, compared to the previous year.

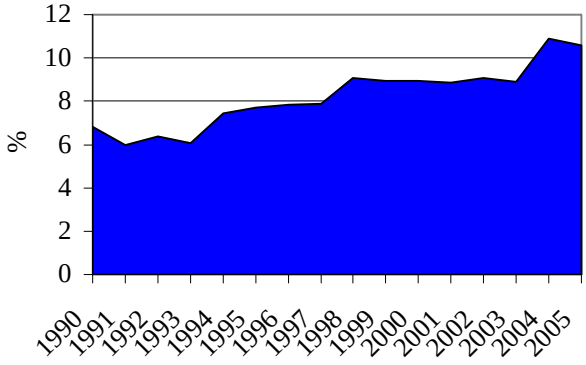
Aggregated greenhouse gases emissions from industrial processes in 1990-2005 had a slightly rising trend. Compared to 1990, in 2005, these emissions from industrial processes increased by 3.2 %.

Trend of aggregated emissions of the greenhouse gases from industry (Gg CO_2 equivalent)



Source: SHMI

Share of the emissions of greenhouse gases from industry on the greenhouse gases overall emissions



Source: SHMI

In 2005, **industry alone generated 6 048 208 tons of waste** (64.5 % share in total waste generation), including **304 266 tons of hazardous waste** and **5 743 943 tons of other waste**.

Extraction of minerals

Changes that occurred in 2005 lead to the reduction in the exploitation of the majority of minerals. Increase trend was in the extraction of limestone and cement raw material.

Trend in extraction of minerals between 1999-2006

Extracted mineral	Measure unit	1999	2000	2001	2002	2003	2004	2005	2006
Brown coal and lignite	kt	4 041.8	3 947.6	3 761.9	3 661.2	3 508.8	3 101.7	2 513.0	2 208.59
Crude oil. including gasoline	kt	60.264	56.892	54.085	51.770	47.943	42.082	33.15	30.52
Natural gas	thous. m^3	218 569	227 038	195 938	200 812	186 797	178 088	150 851	136 881.00
Ores	kt	1 083.7	1 104.0	1 047.5	719.2	706.5	977.8	651.89	741.95
Magnesite	kt	1 423.8	1 535.2	1 573.0	1 464.5	1 640.9	1 668.9	1 555.0	1 467.80
Salt	kt	100.2	101.8	104.0	102.7	104.8	104.3	105.1	122.50
Building stone	thous. m^3	3 473.9	3 540.4	3 881.6	4 478.3	4 503.3	4 527.5	6 016.2	6 309.20
Gravel sands and sands	thous. m^3	2 874.4	2 443.3	2 689.4	2 933.1	3 872.7	3 951.7	4 870.1	5 502.87
Brick clay	thous. m^3	480.3	529.5	442.1	433.4	507.4	591.7	466.8	508.00
Limestone and cement raw materials	thous. m^3	294.1	320.2	302.3	332.7	384.9	569.5	690.6	673.50
	kt	1 398.1	1 419.5	1 614.6	1 547.4	1 649.4	3 479.8	3 743.3	4 131.20
Limestone for special purposes	thous. m^3	200.9	299.4	292.3	833.0	941.4	14.9	28.50	67.00
	kt	320.0	345.0	325.0	0.0	0.0	1 057.5	834.80	1 243.60
High-content limestone	kt	4 603.4	4 176.5	4 211.1	4 356.8	4 093.0	3 767.3	4 053.5	4 393.00
Other raw materials	thous. m^3 (surface)	896.1	983.7	1 026.9	1 216.8	1337.2	567.8	509.1	531.60
	kt (underground)	120.0	127.7	142.3	86.4	86.2	91.6	106.5	115.30
	kt (surface)	0.0	2.4	32.30	31.1	11.8	1 143.9	1 024.0	1 279.29

Source: MMO SR

Brown coal and lignit extraction in 2005 dropped again. Individual mines showed 2 208.59 kt of extracted volumes. This is the lowest extraction volume since 1997. Compared to 2004 the number of workforce in this industry decreased by 5.5 %.

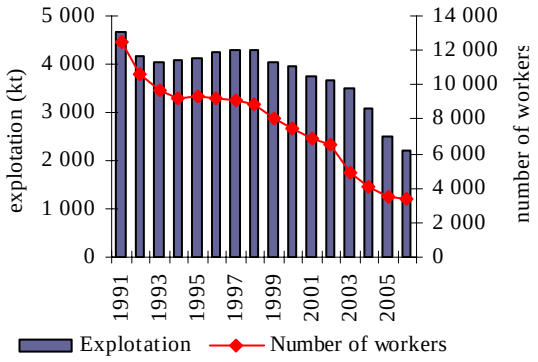
Crude oil, gasoline, and natural gas extraction was also decreased, compared to the previous year. Total extracted volumes included 27 663 t of semi-paraffin crude oil, and 2 843 t of gasoline. Natural gas stores decreased by 136 881 thous. m^3.

Exploitation of **ore minerals** decreased. The Siderit, Ltd. company in Nižná Slaná has the biggest share on all ore volumes, (660.4 kt) The Slovenská banská Ltd. company in Hodruša Hámre, contributed by 19.45 kt, while Rudňany contributed by 62.1 kt.

In 2006, there was a slight increase in exploitation of **non-ore raw material.** However. 1 467.8 kt of *magnesite* was extracted at three significant magnesite deposits (Jelšava, Lubeník, Hnúšťa), which is a reduction by 87.2 kt, compared to the previous year. In 2006, exploitation of *rock salt* (Solivary, Prešov) was at the level of 122.5 kt of salt in salt water, from which 99.4 kt of salt was produced.

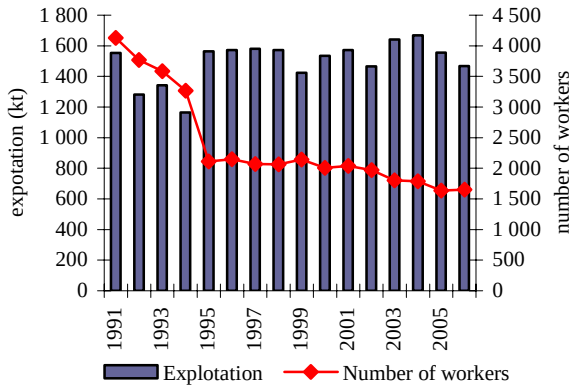
Basic indicators of mineral extraction trend in SR between the years 1991-2005

Trend in brown coal and lignite extraction



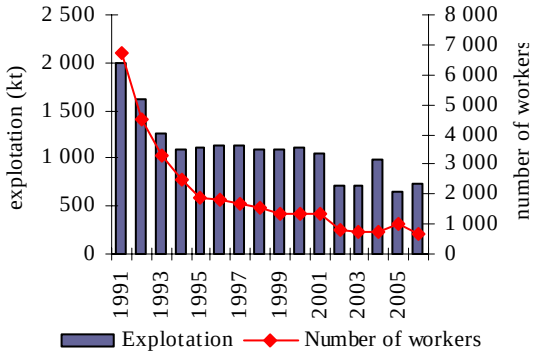
Source: MMO SR

Trend in magnesite extraction



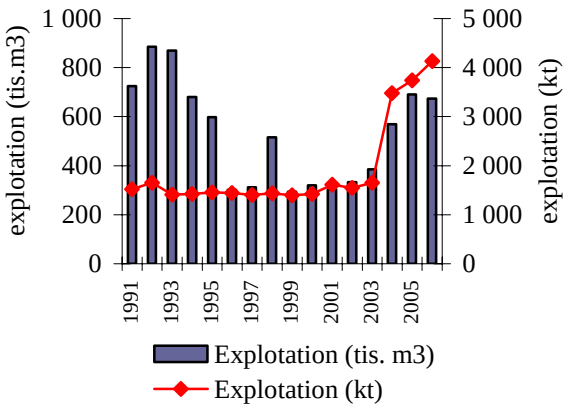
Source: MMO SR

Trend in ores extraction



Source: MMO SR

Trend in limestone and cement materials extraction



Source: MMO SR

♦ **Environmental impact of mineral exploitation**

Mineral extraction is demanding in terms of environmental protection. SGIDS has been commissioned, to keep a register of abandoned mining works. As of December 31, 2006, the register had 16 569 objects left after abandoned mining activity.

The Central mining office keeps records of current mining works including **dumps** and **tailings dumps.** As of December 31, 2006, there were 104 active (78 in the extraction site, 26 outside the extraction site) and 48 inactive **dumps** (37 in the extraction site, 11 outside of it) left after the extraction of minerals, and also 36 active (23 in the extraction site, 13 outside the extraction site) and 11 inactive (53in the extraction site, and 8 outside the extraction site) **tailings dumps.** Compared to the previous year, territory with located dumps increased, while the area of tailings dumps decreased only slightly.

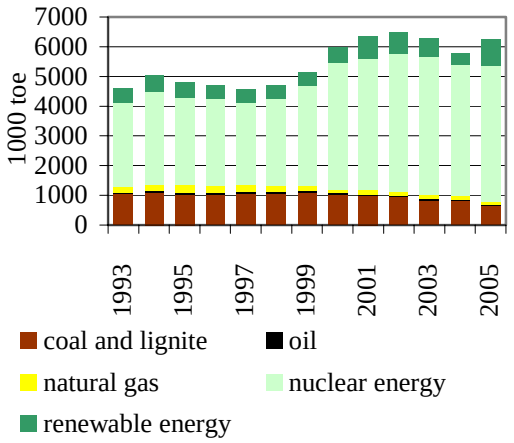
Energy management, Heat production and Gas management

- **Energy sources balance**

SR ensures almost 90 % of the primary energy sources (PES) through purchase outside the internal EU market. The only significant domestic energy source is brown coal, which covers 79 % of brown coal consumption needed for electricity and heat production. Domestic exploitation of natural gas and crude oil is not significant.

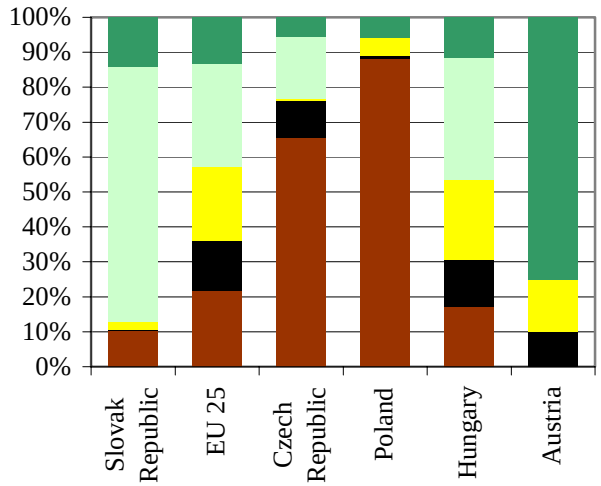
Structure of exploited PES in the SR since 1996 is typical for the increased consumption of gas fuels and renewable energy sources at the cost of consumed solid fuels, also due to more strict emission limits. Utilization of nuclear fuels in recent years plays an exceptionally significant role in the PES structure of the SR. We expect only a slight increase in crude oil consumption, especially in the sector of transportation, due to the replacement of crude oil-based components with bio-fuels.

Trend in used primary energy sources in the SR



Source: EUROSTAT

Structure of primary energy sources in 2005 – international comparison

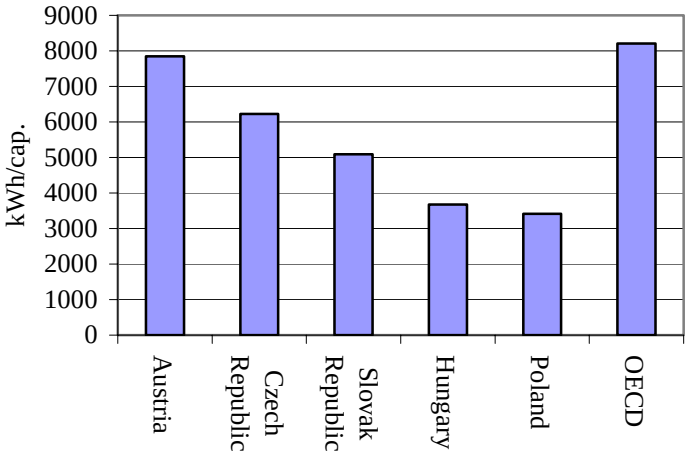


Source: EUROSTAT

Consumption of primary energy sources per capita in the SR is still lower than in the EU 15 countries, which is less than 150 PJ per capita. Although it showed some increase in the last year, it currently does not reach more than 90 % of the EU average.

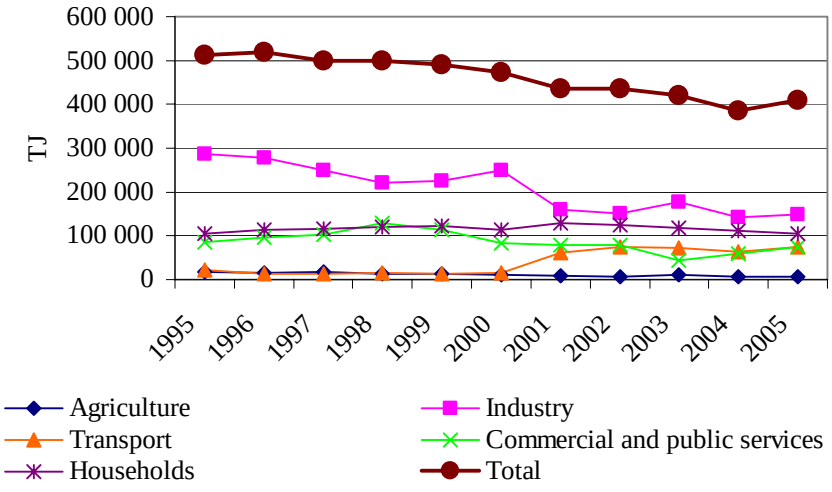
Compared to the developed OECD and EU countries, Slovakia has a low electricity consumption per capita, which is caused mainly by low electricity consumption by households and services. A 1.2% year-to-year growth of total electricity consumption is expected, as well as reduction in electricity production due to shut-downs of production electricity sources. This will mean that electricity production from 2007 to 2010 will not cover the anticipated demand.

Electricity consumption per capita in 2005 – international comparison



Of all sectors, industry has the greatest final consumption in all fuel types in the SR. Compared to the other EU countries, a relatively low household consumption has not changed, while the sector of transportation shows increased energy consumption since 2000.

Trend of final energy consumption in sectors of economy



Source: SO SR

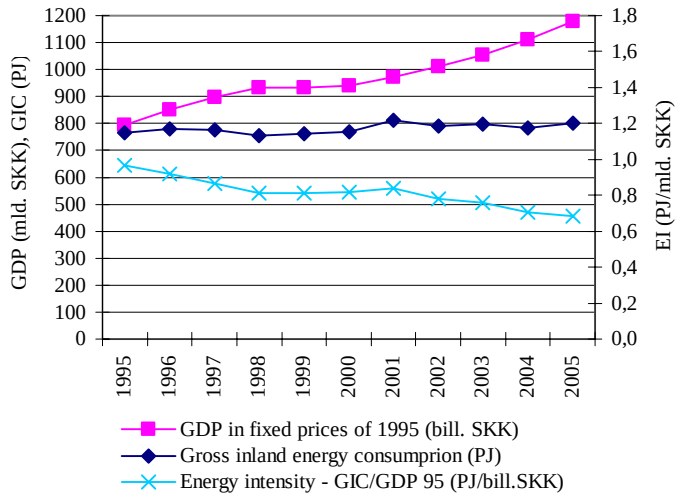
♦ **Energy intensity**

Energy intensity (EI) is an important economic indicator also used to make international comparisons. It is defined as the share of the gross inland energy consumption (GIC) on the generated GDP (GIC/GDP=ED). Over the recent years, the GDP growth was accompanied by a balanced consumption of energy sources and a drop in the final energy consumption. Since 1993, energy intensity

has been decreasing every year by 4 %, caused mainly by more development in the value added production, as well as by introduction of rationalization measures in production and consumption alike.

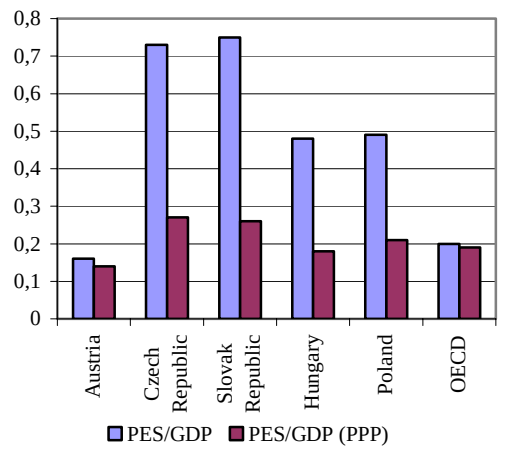
Notwithstanding this positive trend, the EI in Slovakia is still about 1.5-times higher than the average consumption of the OECD countries.

Trend in selected indicators of energy intensity in SR



Source: SO SR

Energy intensity in 2004 – international comparison



Source: IEA

Note:
PES/GDP (toe/USD) – energy intensity by PES,
PES/GDP – PPP (toe/USD) - energy intensity by PES, expressed through the purchase power parity (PPP) that evaluates movements in exchange rates in prices over long time periods. Thus, the differences among individual countries are reduced.

- **Electricity power management**

Present composition of installed outputs of the SR sources is equally distributed among the nuclear, heat, and hydro power plants. More that a half of the electricity production is provided by nuclear power plants, while thermal power plants represent app. 30 % of the production, the rest of the produced electricity comes from hydro power plants.

Generation station capacity according to the type in SR (MW)

Indicator	1998	1999	2000	2001	2002	2003	2004	2005
Nuclear power plant	2 200	2 200	2 640	2 640*	2 640*	2 640*	2 640*	2 640*
Thermal power plant	3 159	3 132	3 144	3 190*	2 929*	3 319*	3 120*	3 090*
Hydro power plant	2 417	2 419	2 420	2 470*	2 505*	2 507*	2 518*	2 488*
Total	7 777	7 752	8 205	8 300*	8 074*	8 466*	8 278*	8 218*

Source: SO SR, MoEC SR

Note: The output of the thermal power plants includes also the output of the gas-fired and combustion power units.
* Data taken from revised methodology SO SR 2002

In 2005, total produced electricity in the SR energy network dropped on the year-to-year basis by 4.17 % to 29 291 GWh.

Overall domestic electricity consumption dropped on the year-to-year basis by 9.33 % to 26 026 GWh, which is 2 679 GWh less than in 2004. Domestic electricity consumption was fully covered from the internal production. Availability of resources made it possible to locate part of the produced electricity on international markets, reaching the balance of 3 265 GWh (export-dominant).

- **Gas management**

Slovak Gas Management Industries in Bratislava is the dominant company on the Slovak gas market, with the greatest market share. In 2006, the company provided services to approximately 1.461 mil. of clients in various segments (bulk clients, small clients, and households). Approximately 98 % of domestic gas consumption is imported from the Russian Federation. Compared to 2005, the sale of natural gas on the designated Slovak territory in 2006 dropped by 0.57 %.

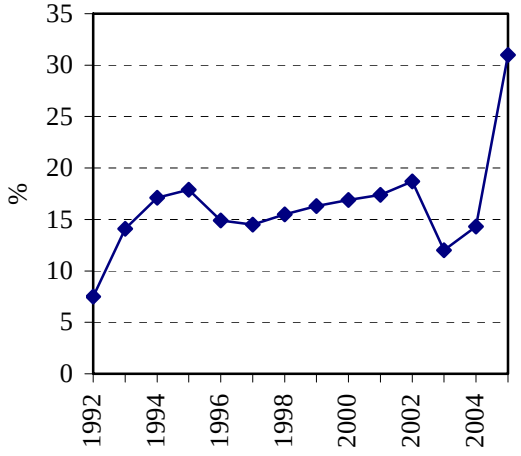
The Slovak gas distribution system is interconnected with the neighboring countries' networks, specifically with Ukraine, Czech Republic and Austria. Capacity of the transport network is more than 90 mill. m^3 annually.

Natural gas consumption in the Slovak Republic in 2006 was 7.2 mil. m^3.

- **Renewable energy sources (RES)**

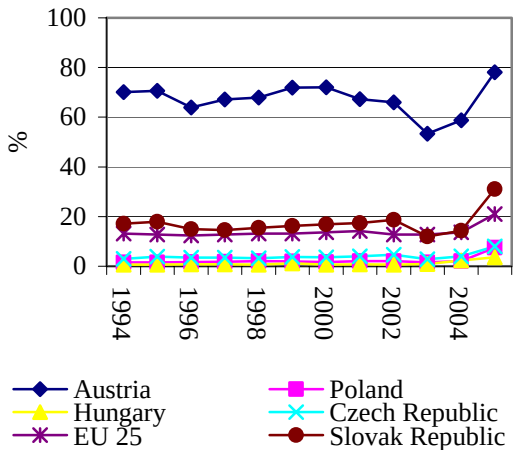
Increase in renewable energy sources‘ extraction represents a significant element in the system of measures introduced to meet the Kyoto Protocol's objectives. Share of electricity produced from the RES (renewable energy sources) on total electricity consumption in 2006 was 16.5 %. Hydro power plants have the greatest share on electricity production from all RES in Slovakia (more than 90 %). For this reason, volumes of electricity produced within the Slovak RES network fully depend on favorable hydro-energy conditions. Biomass is the dominant RES used to produce heat. In total, RES reached a 4.4 % share on the gross domestic energy consumption in 2005.

Share of electricity from renewable energy to gross electricity consumption



Source: EUROSTAT

Share of electricity from renewable energy to gross electricity consumption – international comparison

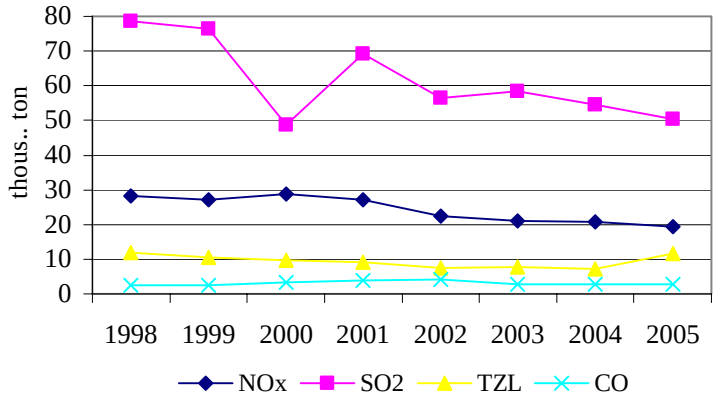


Source: EUROSTAT

- **Air pollution caused by energy production**

Over the recent years, sulfur oxides (SO_2), nitrogen (NO_x), and particulate matter (PM) emissions were reduced significantly. This situation was caused by decreased production and consumption of energy and a shift in the fuel base toward more purified fuels, as well as by using fuels with better quality characteristics.

Trend of basic polluting substances emissions from energy stationary sources in 1998-2005 in the SR



Source: SHMI

Power management sector has the most dominant share on the greenhouse gases emissions. In 2005, the share was almost 80 % of total greenhouse gases emissions in the SR. Compared to 2000, total greenhouse gases emissions in the SR in 2006 dropped 36.1 %.

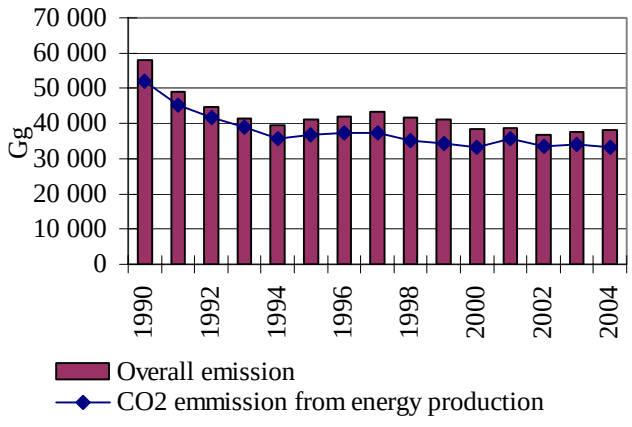
Trend of greenhouse gasses emissions from energy production in the SR (thousand tons)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
*** Power management sector**	58.59	51.03	47.23	44.37	41.31	42.60	43.19	43.39	41.66	40.56	37.82	40.64	38.55	39.03	37.81	37.40

*transport included

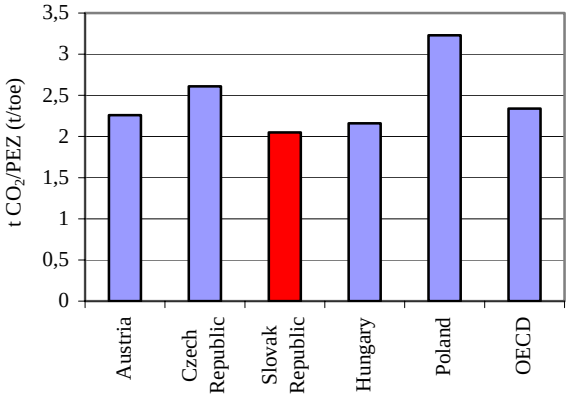
Source: SHMI

Trend of CO_2 emissions from energy production (thousand tons)



Source: SHMI

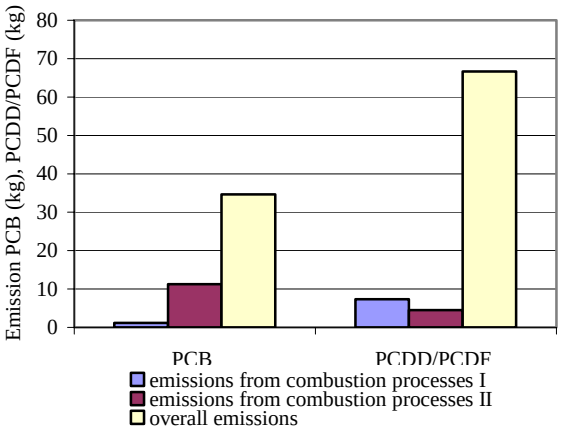
Energy Intensity according to CO_2 in 2004 – international comparison



Source: IEA

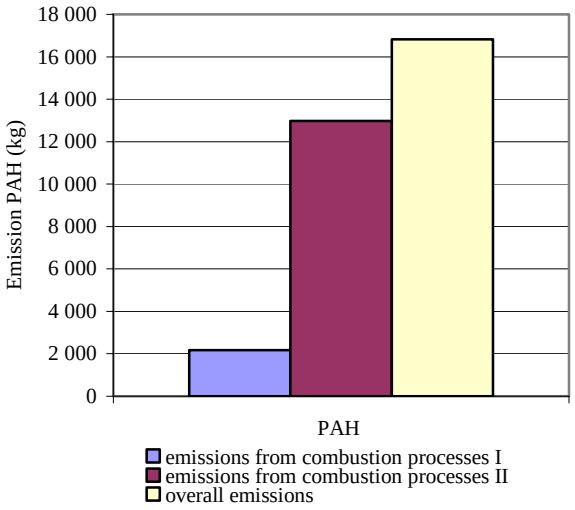
The POP emissions have a falling tendency since 1990. This is caused by a drop in the production and changes to fuels used for household heating. Fluctuations in the PCB emissions (their increase) in 2003 and 2004 relates to the increased consumption of firewood for household heating.

PCB and PCDD/PCDF emissions from energy production in 2005



Source: SHMI

PAH emissions from energy production in 2005



Source: SHMI

Positive trend in the power management sector is recorded mainly by a dramatic reduction to **heavy metals emissions** (Pb, As, Cu, Ni, Zn). In the 2005 emission of Cr and As from power management sector accessed the 10 % share of total emission of heavy metals.

- **Waste water from electricity production and gas management**

Of all areas within the energy sector, electricity power management contributed the most to total volumes of discharged wastewater. Wastewater produced by electric power plants mainly includes water from technological and cooling processes, and also some runoff water. Wastewater from technologies is chemically contaminated. In case of nuclear power plants, water from the primary cycle also shows a degree of radio-chemical contamination. Water used as a coolant shows mostly thermic contamination. Greatest load exists in the chemical oxygen demand for the CODCr (dichromate) indicator, and insoluble substances (IS).

Waste water discharged by energy production in 2006

Waste water from electricity production	Volume (thousand $m^3.y^{-1}$)	IS ($t.y^{-1}$)	BOD_5 ($t.y^{-1}$)	COD_{Cr} ($t.y^{-1}$)	ENP_{uv} ($t.y^{-1}$)
Treated	16850.067	108.732	29.424988	295.8140	0.415975
Untreated	64277.791	145.7276	3.258854	26.05199	0
Subtotal	81127.858	254.4596	32.68384	321.8660	0.415975
Waste water from heat production					
Treated	1414.054	11.72186	4.000295	15.94265	0.217793
Untreated	634.129	2.353763	0.088627	0.446672	0.001056
Subtotal	2048.183	14.07562	4.088922	16.38932	0.218849

Source: SHMI

- **Waste water from electricity production and gas management**

In 2005, the SE company, Inc. produced total volumes of 1 147 206 tons of waste of all categories, including 99.7 % from the „other waste“ category. Waste from thermal power stations of SE Inc. was **98.22 %** of total generated waste, while the SE Inc. nuclear waste was **1.56 %**, and waste from the aquatic SE Inc. power plants was **0.21 %** of total generated waste.

The SPP Inc. company produced 17 333 tons of waste in 2005, including 13 072 tons of other waste, and 4 261 tons of hazardous waste. Increase in the volumes of generated waste in 2005 was caused by a legislative change to the definition of the waste origin relating to service, cleaning and maintenance activities.

Transport

- **Transport share on GDP production**

Sector of transport represented 6.0 % of the GDP production in 2006.

Transport share on GDP production (%)

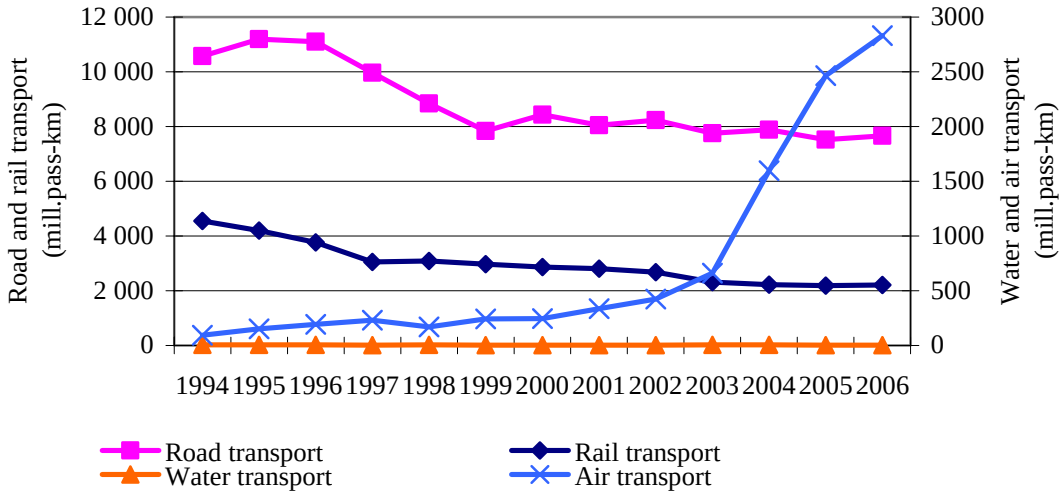
	1993	1996	1999	2000	2001	2002	2003	2004	2005	2006
Transport	6.1	8.3	7.8	7.5	7.6	7.6	7.1	6.8	7.2	6.0

Source: SO SR

- **Passenger and freight transport**

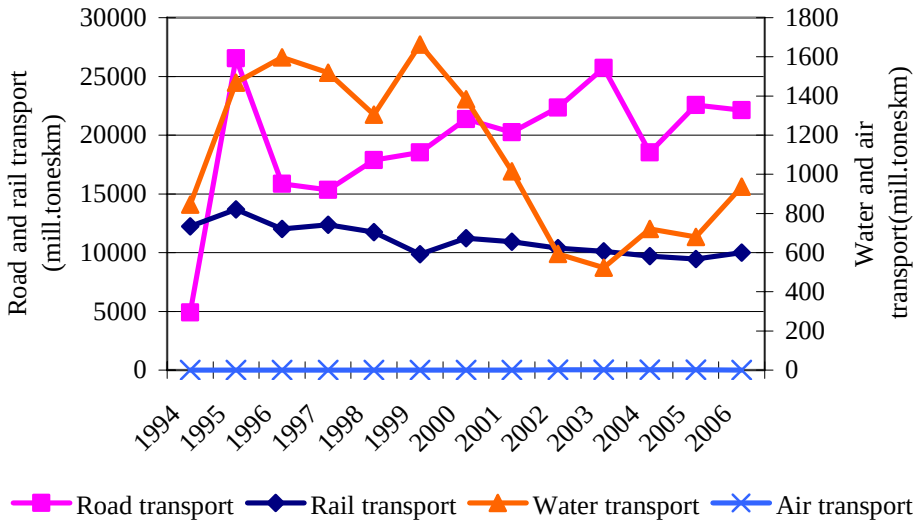
In the area of road and railway passenger transport, the trend of long-term drops in transported passengers and total transport performances contuinued. Compared to 1993, reduction in modal split in road passenger transport was more than 30 %, in case of the railway transport the reduction was even by more than 50 %. Modal split in water passenger transport dropped by more than 40 %. Transport of goods and modal split in road cargo transport grow continually. Road transport shows the greatest share on modal split by cargo transport - appr.60 %. In 2006, modal split by railroad transport dropped by more than 30 %, compared to 1993, while modal split by aquatic cargo transport in 2006 dropped by appr. 11 %, compared to 1993.

Passenger transport demand by mode (mill. pass-km)



Source: SO SR

Freight transport demand by mode (mill. tkm)



Source: SO SR

MHD companies of Bratislava, Košice, Prešov, and Žilina operate the municipal mass passenger transport (MHD).

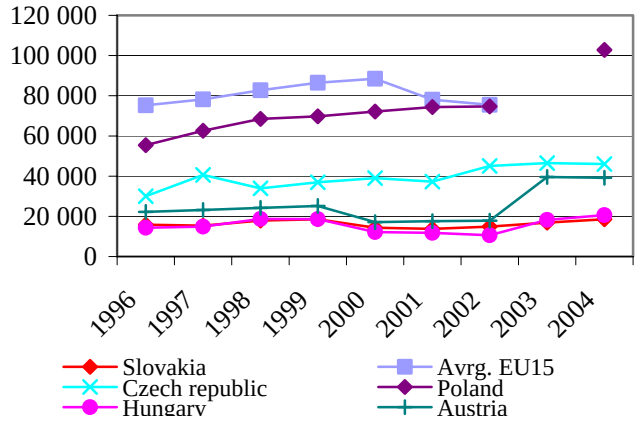
Over the period of 13 years (1993-2006), there was reported a 23.8 % decrease in the number of carried passengers. Compared to 1993, slight growth was recorded only in 1996 (3.3 %) and 1997 (0.3 %). Buss transportation has over the monitored time period been the major player in passenger transport, followed by tram and trolley buss transportation.

Indicators of city transport

Indicator	1993	1996	1999	2000	2001	2002	2003	2004	2005	2006
Total number of transported passengers (ths.)	525 744	543 246	485 472	404 539	373 269	370 018	394 465	383 118	395 064	400 673
Trams										
Transported passengers (ths.)	188 768	143 259	117 714	100 185	98 719	96 553	104 560	104 391	109 101	109 836
Seat kilometres (mill. km)	2 734	1 960	1 888	1 802	1 866	1 780	1 764	1 818	1 822	1 797
Trolleybuses										
Transported passengers (ths.)	43 346	71 689	71 934	62 997	53 167	54 707	59 034	57 688	58 032	59 071
Seat (mill. km)	717	799	1 039	1 029	1 008	1 048	1 110	1 103	1 075	1 085
Buses										
Transported passengers (ths.)	293 629	328 298	295 824	241 357	221 383	218 758	230 871	221 039	227 931	231 766
Seat (mill. km)	4 998	4 265	4 638	4 011	3 996	3 990	3 899	3 881	3 846	3 823

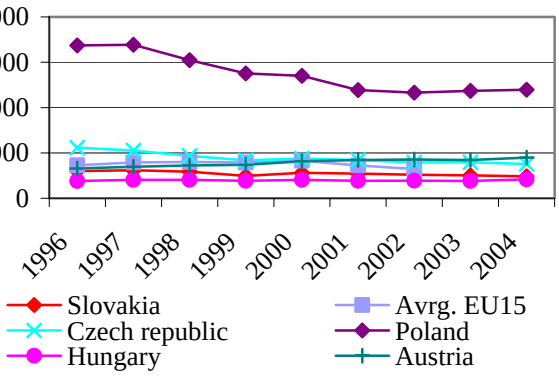
Source: SO SR

Freight transport demand by road (mill. tkm)



Source: EUROSTAT

Freight transport demand by rail (without passenger cars) (mill. tkm)



Source: EUROSTAT

- **Number of vehicles**

Notwithstanding a slight decrease in annual increments in the number of road motor vehicles, total number of motor vehicles in 2006 over the period on 1993-2006 grew by 25 %. Major increase in the number of motor vehicles in 2006 was recorded in the categories of heavy trucks and pickup trucks (grew by 70 %, compared to 1993), and passenger cars (grew by 34 %, compared to 1993). Number of transport vehicles in railroad and water transport types (being the most environmental-friendly transport modes for passengers and goods) dropped by appr. 27 % over the last 11 years.

Number of motor-vehicles by individual types (pcs)

Total number of vehicles	1993	1996	1998	2000	2001	2002	2003	2004	2005	2006
Passenger cars	994 933	1 058 425	1 196 109	1 274 244	1 292 843	1 326 891	1 356 185	1 197 030	1 303 704	1 333 749
Trucks and Pick up vans	101 552	97 078	111 081	110 714	120 399	130 334	142 140	140 395	160 089	172 781
Special vehicles	46 121	45 430	43 690	39 188	36 082	34 150	32 033	22 672	22 648	18 708
Road tractors	*	*	1 721	3 281	4 994	6 837	8 851	11 435	14 141	16 475
Buses	12 655	11 321	11 293	10 920	10 649	10 589	10 568	8 921	9 113	8 782
Tractors	65 150	62 810	63 448	64 351	63 422	62 644	61 690	44 080	46 544	43 888
Motorcycles (excl. small)	81 263	79 479	100 891	45 647	46 676	47 900	48 709	51 977	56 366	58 101
Trailers and Semi-trailers (included bus)	167 174	176 246	191 241	201 269	206 627	213 167	218 517	170 491	188 411	188 256
Others	-	-	-	2 226	1 507	1 306	1 161	-	101	535
Total	**1 468 848**	**1 530 789**	**1 719 474**	**1 751 840**	**1 783 199**	**1 833 818**	**1 879 854**	**1 647 001**	**1 801 117**	**1 841 275**

[1] in 1993-1996 included among special vehicles, since 1997 newly-purchased and monitored independently

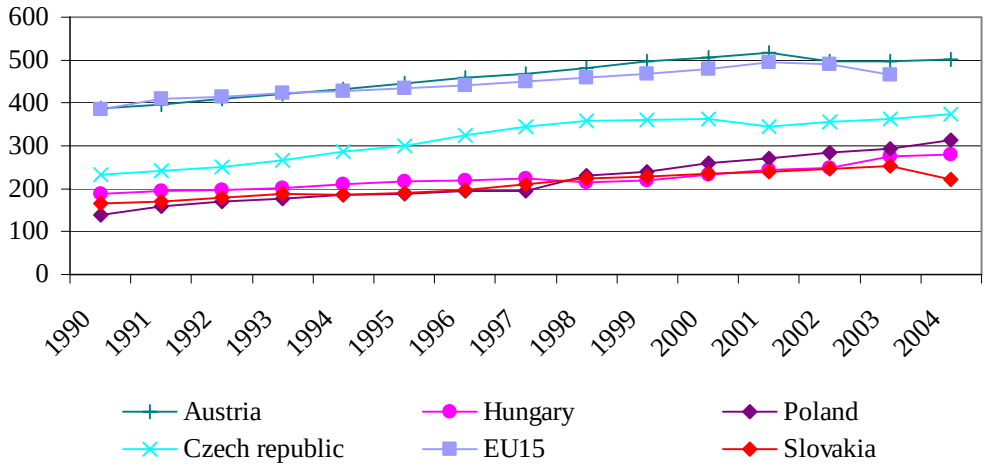
Source: SO SR

Rail transport equipment (pcs)

Total number of vehicles	1996	1999	2000	2001	2002	2003	2004	2005	2006
Locomotive	1 296	1 253	1 208	1 167	1 131	1 116	1 072	1 079	1 087
Diesel railcars	373	383	361	344	320	315	279	281	251
Wagons	35 898	29 710	26 975	24 587	24 796	23 973	24 936	25 515	25 989
Passenger railway vehicles	2 096	1 703	1 642	1 561	1 873	1 597	1 524	1 286	1 311
Combined transport	-	349	457	452	449	227	449	257	257
Total	**39 663**	**33 398**	**30 643**	**28 111**	**28 569**	**22 522**	**27 811**	**28 161**	**28 895**

Source: SO SR

Number of passenger cars per 1 000 inhabitants– international comparison



Source: EUROSTAT

- **Transport infrastructure**

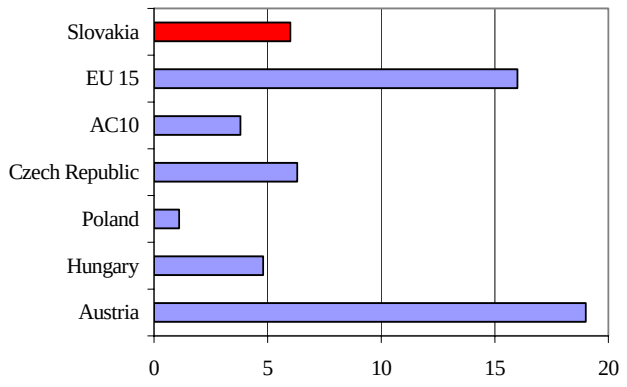
In 2006, the SR transport network included 17 828 km of roads and motorways. Highways represented 328 km of the network. The length of railways was 3 665 km, with 1 557 km of electrified tracks. The length of navigable watercourses remained unchanged at 172 km, with channel length of 38.45 km.

Basic data on the transport infrastructure (km)

Indicators	1993	1996	1999	2000	2001	2002	2003	2004	2005	2006
Length of roads and motorways	17 865	17 867	17 734	17 737	17 736	17 750	17 772	17 780	17 803	17 828
of which motorways	198	215	295	296	296	302	313	316	328	328
Length of railways	3 661	3 673	3 665	3 662	3 662	3 657	3 657	3 660	3 658	3 658
of which electrified lines	1 415	1 516	1 535	1 536	1 536	1 556	1 558	1 556	1556	1 577
Length of navigate inland waterways and watercourses	172	172	172	172	172	172	172	172	172	172
of which watercourses	38.45	38.45	38.45	38.45	38.45	38.45	38.45	38.45	38.45	38.45

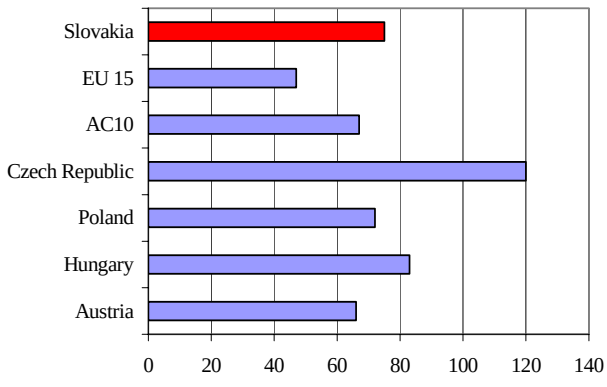
Source: SO SR

Density of the road network (km/1 000 km^2) – international comparison



Source: EUROSTAT

Density of the railway network (km/1 000 km^2) – international comparison



Source: EUROSTAT

- **Demand of transport on the utilisation of resources**

Final energy consumption in the transport sector over the period of 14 years has more than doubled itself. Overall consumption of liquid fuels (96 %) represents the greatest share of energy consumption in the transport sector on the overall energy consumption, while the share of solid fuels, gaseous fuels and electricity overall consumption remains small. Road transport shows the greatest share on the overall energy consumption in the transport sector (95 %).

- **Impact of transport on environment**

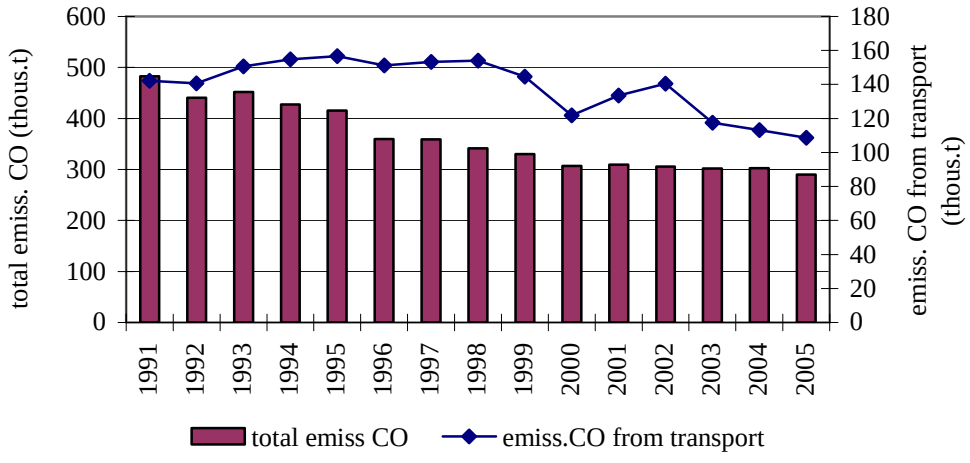
Over the recent years, important changes in the SR were introduced by a significant increase in the number of motor vehicles. Corresponding changes to the transport situation were dominant mainly in cities and residential zones, where there is an increased load on environment and public health.

- **Emissions from transport**

In terms of transport's share on total emissions of the assessed pollutants for 2005, significant is transport's share on CO emissions – 38 %, 43 % in case of NO_x and 24 % in case of NM VOC.

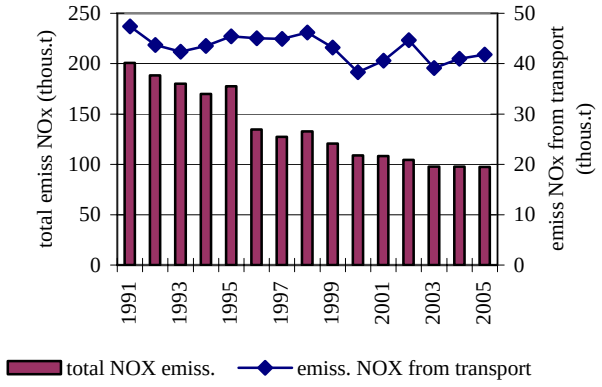
Solid pollutants represented 18 % of all emissions in 2004, while the SO_2 emissions showed 0.3 %. Transport's share on heavy metal emissions is approximately 3.2 %, with copper showing the greatest share on heavy metal emissions by transport (8.7 %) followed by zinc (3.1%), and lead (3 %). Similarly, in case of other heavy metals there was a slight increase in the values of the recorded emissions, compared to the previous year.

Trend in CO emissions from transport compared to total CO emissions in the SR



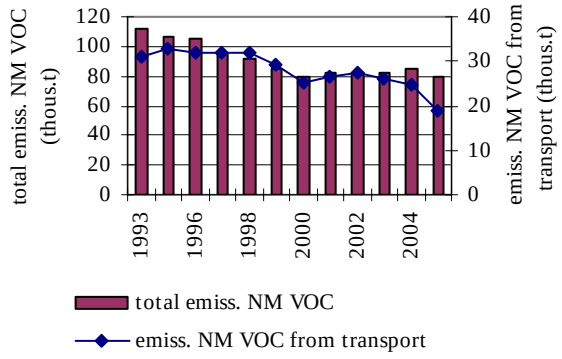
Source: SHMI

Trend in NO_x emissions from transport compared to total NO_x emissions in the SR



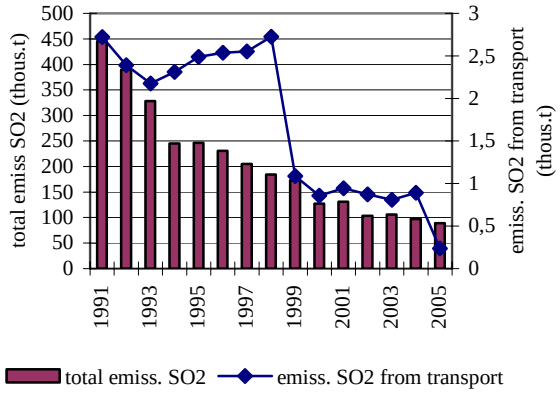
Source: SHMI

Trend in NM VOC emissions from transport compared to total NM VOC emissions in the SR



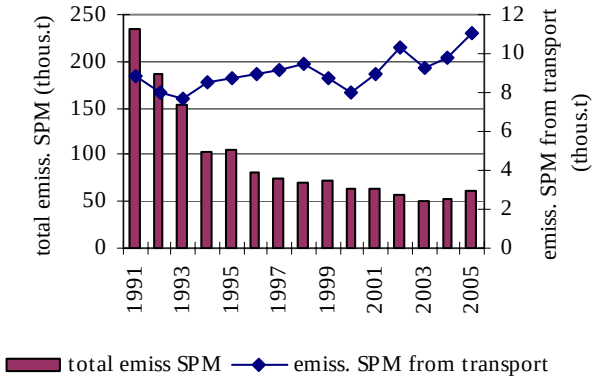
Source: SHMI

Trend in SO_2 emissions from transport compared to total SO_2 emissions in the SR



Source: SHMI

Trend in SPM emissions from transport compared to total SPM emissions in the SR



Source: SHMI

- **Waste from transport**

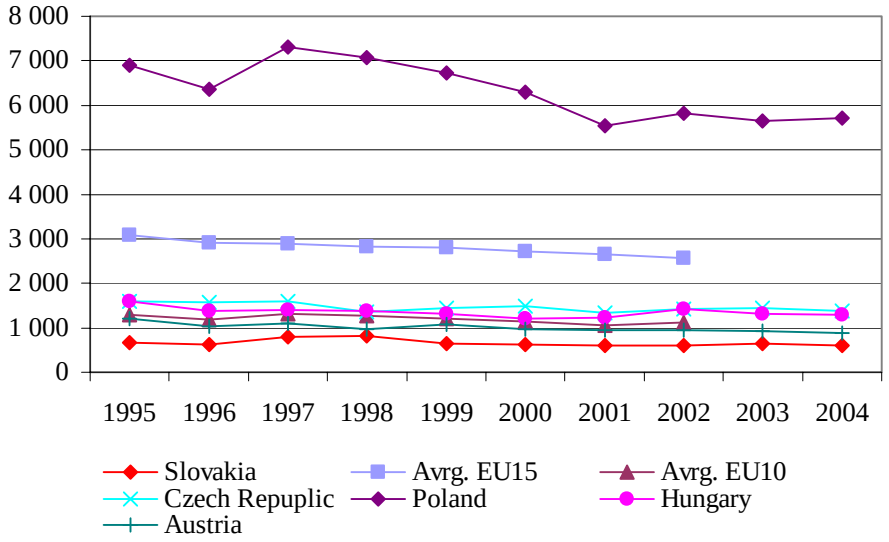
In 2006, there was 2 407 595.21 tonnes of waste generated in the area of transportation. This included 64 193.80 tons of hazardous waste, and 2 343 401.41 tons of other waste. Increase in 2006 was caused by recording about 2 273 000 tons of excavated soil from ground works when building the Sitina tunnels in Bratislava.

- **Traffic accident rate**

In 2006, there is a slight increase in the number of traffic accidents, compared to the previous year.

However, over the monitored period of 1993-2006, the number of traffic accidents increased by 20 %. Traffic accidents aftermath analysis still shows a negative trend, with increasing numbers of traffic casualties, heavily injured, and lightly injured.

Number of people killed in road accidents – international comparisons



Source: EUROSTAT

Agriculture

♦ Economy of agriculture

In 2006, **percentage of agriculture on gross domestic product** was **4.4 %.** Involvement of agriculture in all indicators of the national economy decreased, compared to 2005.

♦ Structure of agricultural land

In 2006, **total area of agricultural land** in the SR was 2 430 683 ha. **Loss** of agricultural land including the arable land transfer to forestland, non-agricultural and non-forested land in 2006 was **2 574 ha.** Loss in agricultural land was mostly the result of construction activity (1 380 ha), including the civil and household construction (548 ha), 546 ha of agricultural land was forested. In 2006, there was a reduction in the size of arable soil, permanent grasslands, fruit orchards, gardens and hopp-fields. Only vineyards showed a slight increase.

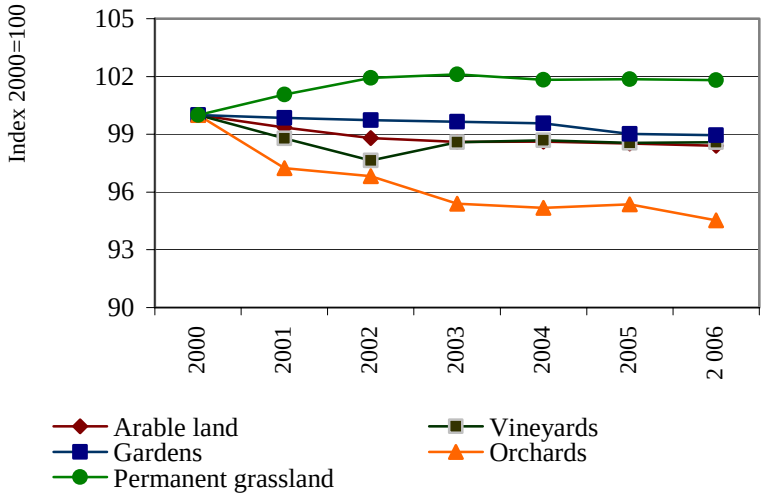
Structure of the agricultural land (state to the date 31st December 2006)

Type of land	Area(ha)	Share of agricultural land (%)
Agricultural land total	2 430 683	100.00
Arable land	1 427 357	58.73
Hop-fields	534	0.02
Vineyards	27 314	1.12
Gardens	76 813	3.16
Orchards	17 792	0.73
Permanent grassland	880 873	36.24
Total area of SR	4 903 397	-

Source: IGCC SR

Size of arable land per one inhabitant in 2006 was **0.27 ha.**

Agricultural land fund structure after the year 2000

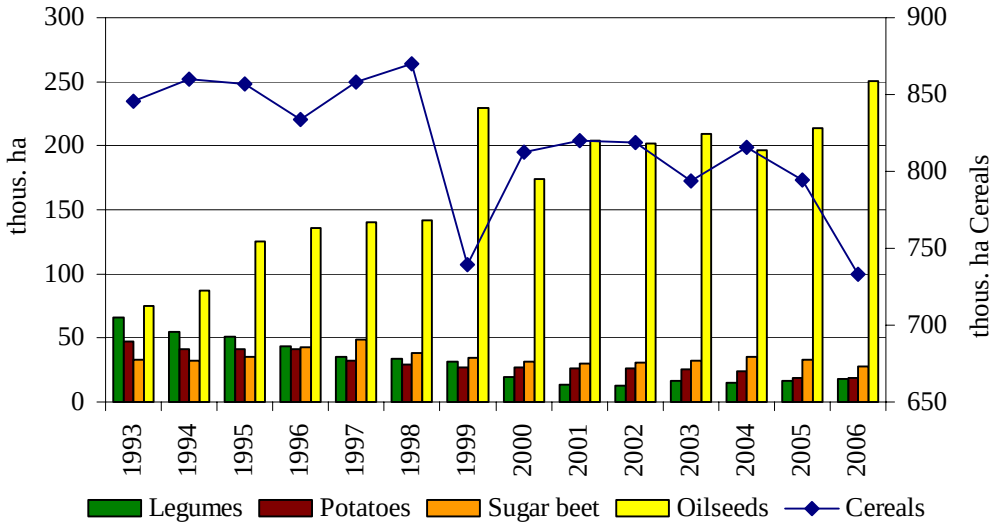


Source: IGCC SR

Plant production

In 2006, **harvest areas in most agricultural crops decreased,** with the exception of oilseeds and legumes. Oilseeds included mostly growing cultures of rape seed and sunflower, as they are used in the production of metylester.

Harvested areas of agricultural crops



Source: SO SR

Compared to 2005, **genetic diversity** (representated varieties of agricultural crop cultivated in the SR) in 2006 shows **an increase** in all mentioned crop categories, with the exception of forage beet.

Number of agriculture plant's varieties in the SR

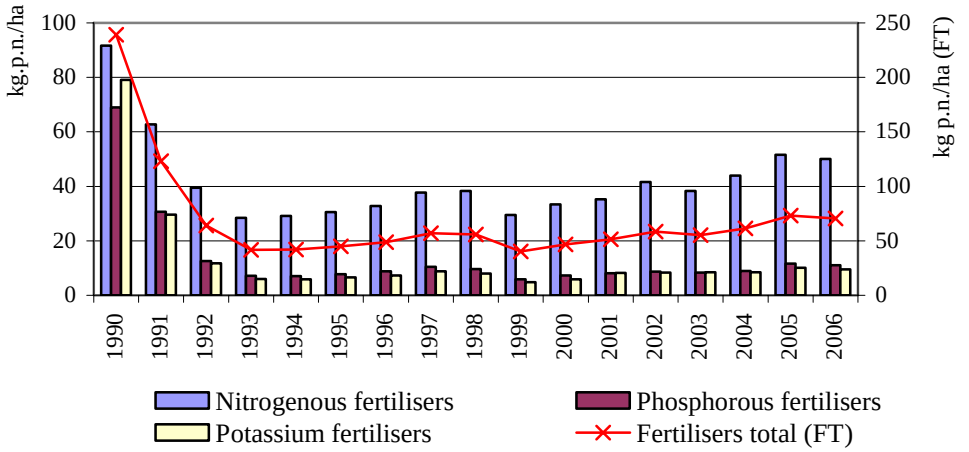
Agricultural plant	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Winter wheat	22	23	22	23	24	25	28	28	34	37	41	45	57	65
Winter barley	10	10	11	8	9	10	11	11	13	14	11	14	14	20
Spring barley	26	25	26	27	24	22	23	24	21	24	28	29	30	36
Potatoes	44	48	60	72	70	67	69	75	78	81	90	103	101	109
Rapeseed	7	10	14	12	12	9	14	16	19	22	25	32	29	35
Sugar beet	28	37	40	52	58	61	63	52	53	42	42	38	41	47
Fodder beet	12	16	16	13	12	6	8	8	8	8	7	6	6	6

Source: RIPP

Fertiliser consumption

In 2006, consumption of **fertilisers** increased from the previous year and reached the level of 70.6 kg of pure nutrients per hectare of agricultural land.

Fertilisers consumption in Slovakia (kg pure nutrient/ha)

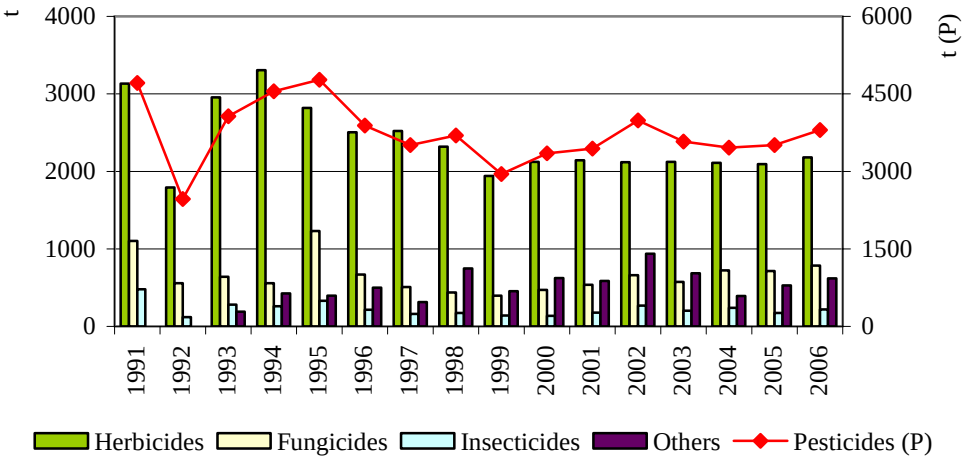


Source: CCTIA

Pesticides consumption

Compared to 2005, total consumption of pesticides in 2006 increased by 8.3 %. Altogether, 3 804 t of pesticides were applied, including 2 178 t of herbicides, 785 t of fungicides, 220 t of insecticides, and 621 t of other pesticides.

Pesticides consumption in Slovakia (t)

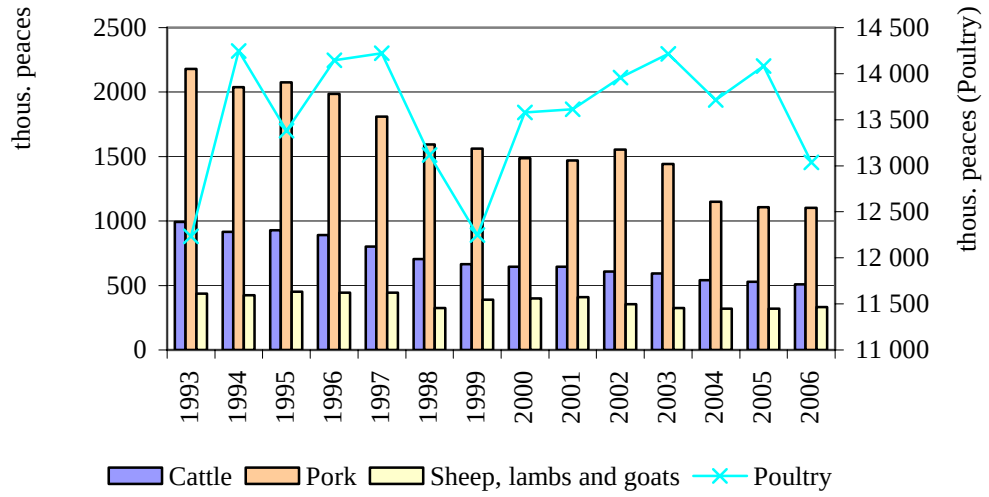


Source: CCTIA

Animal production

In 2006, numbers of major livestock categories again dropped, i.e. cattle, pork, poultry, with the exception of the sheep, lambs and goats, which showed a positive growth in numbers.

Number of livestock in Slovakia (thousand peaces)



Source: SO SR, MoA SR

Genetic diversity expressed by number of livestock in the SR decreased from the previous year in cases of cattle, pork and goats.

Number of livestock breed in the SR

Breed	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Cattle	5	5	5	5	6	6	11	11	11	11	11	11	12	11
Pork	15	15	15	15	15	15	16	15	13	11	11	11	11	8
Sheep	8	9	10	9	9	12	12	13	12	12	13	13	13	13
Goats	2	2	2	2	2	2	2	2	2	2	2	2	3	2

Source: RIAP

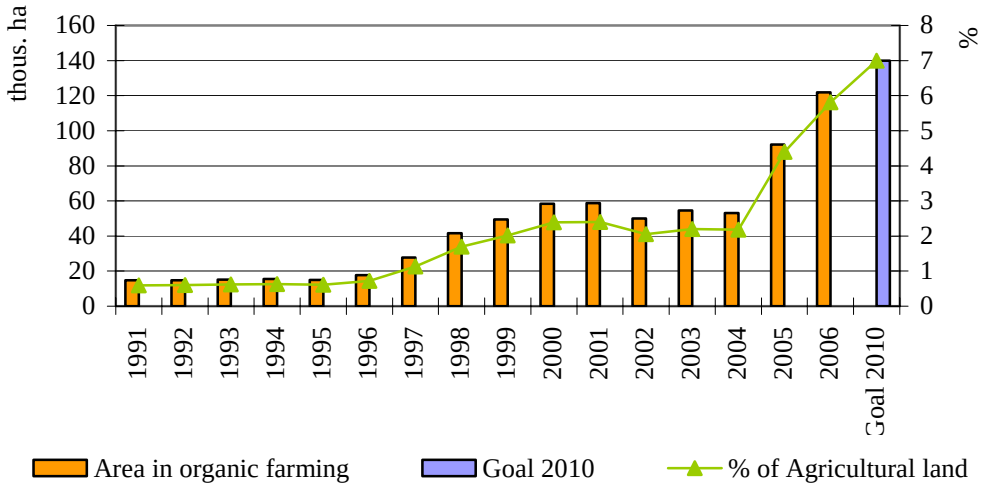
Melioration

After 2000, there was a falling trend in the size of irrigated territories, analogous as utilisation of water for irrigation purposes with certain fluctuations. In 2006, there was 25 325 ha of irrigated agricultural land.

Organic farming

In 2006, the system of organic farming in the SR included 298 subjects farming on 121 956 ha of agricultural land, which is 5.81 % of total agricultural land. The goal is to implement organic farming practices on 7 % of total agricultural land by 2010.

Trend in the organic farming area



Source: CCTIA

In 2006, in total, there were 118 756 number of livestock **raised** in organic farming. More than 390 colonies of bees were included into the system of ecological farming.

Number of livestock in organic farming in Slovakia (pieces)

Livestock category	2005	2006
Cattle	20 133	28 922
Sheep	57 830	87 607
Pork	206	312
Poultry	76	58
Livestock total	79 519 + 390 colonies of bees	118 756 + 390 colonies of bees

Source: CCTIA

Agriculture demands in exploitation of resources

Since 2002, there has been a continuing **growth in the consumption of liquid fuels.** On the other hand, solid fuel consumption decreased. Just like in 2003, there is a falling trend in the consumption of gas fuels, heat, and electricity.

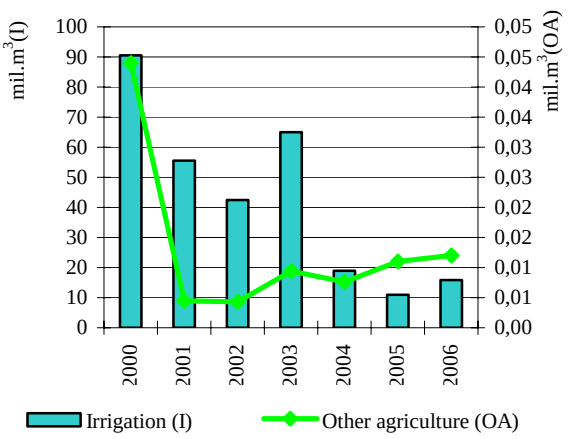
Consumption of selected fuel types, heat, and electricity in agriculture (TJ)

Kind of fuel	2002	2003	2004	2005
Solid fuel	133	131	82	65
Liquid fuel	2 665	2 987	3 250	3 417
Gas fuel	1 869	3 261	1 781	1 670
Heat	270	300	181	179
Electricity	1 850	3 294	1 530	1 411

Source: SO SR

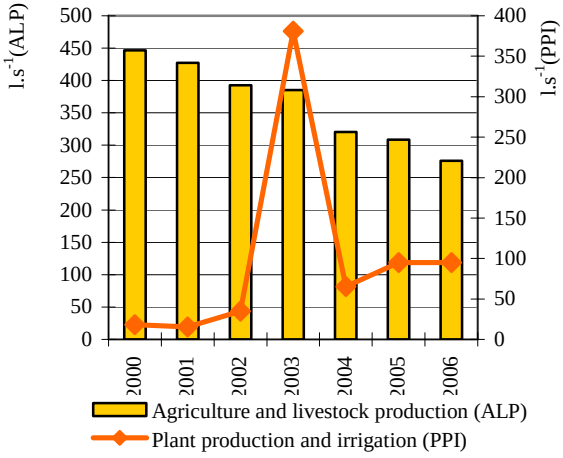
Compared to 2005, in 2006, there was an increase in surface water volumes used in agriculture for irrigation purposes. On the other hand, volumes of groundwater used in agriculture for livestock production, plant production and irrigation purposes slightly decreased.

Trend in surface water use in agriculture



Source: SHMI

Trend in groundwater use in agriculture



Source: SHMI

Production of renewable energy from agriculture

Despite its relatively high potential in Slovakia, use of the biomass for energy purposes is not satisfactory from the perspective of including energy-yielding produce into sowing technologies, as well as production of energy from biogas. Technological equipment is lacking in the area of implementation. In 2006, there were 4 biogas production facilities in operation in Slovakia. Biogas was produced from cattle manure at the volume of the 809 thous.m^3. It is possible to expect the annual production of biogas from cattle excrements at the 241 mil.m^3, and from pork excrements at the 36 mil.m^3. Energy equivalent is 1.95 TWh or 6.9 PJ of heat.

Total annual production of agricultural biomass suitable for heat production in Slovakia

Crop type	Area (ha)		Yield of biomass (t/ha)		Production of biomass (t/year)	
	2005	2006	2005	2006	2005	2006
Thick-sown cereals - total	620 529.68	565 665.38	3.55	3.27	811 152.10	739 890.30
Maize	154 085.67	151 005.65	9.76	7.77	1 503 876.00	1 173 308.80
Sunflower	91 146.09	108 816.00	4.71	4.62	429 297.70	502 729.90
Rapeseed	106 204.00	122 511.38	4.42	4.24	469 421.70	519 446.60
Orchards	7 870.14	7 684.29	3.50	3.50	27 545.00	26 894.00
Vineyards	16 771.70	16 262.09	1.50	1.50	25 156.50	24 393.00
Flight from permanent grasslands	80 000.00	82 000.00	2.00	2.00	160 000.00	164 000.00
Total	1 076 607.28	1 053 944.79	-	-	3 426 449.00	3 150 662.60

Source: SCAR-RIPP

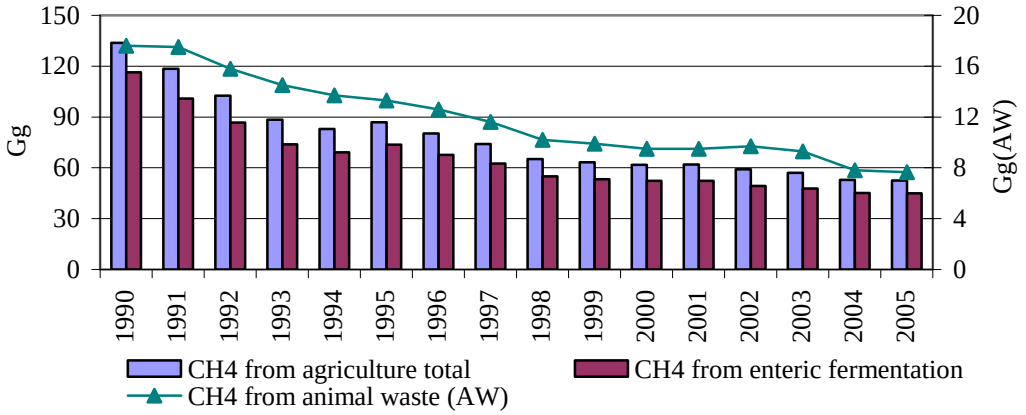
Impact of agriculture on environment

Agriculture is one the important environmental polluters. It mostly contributes to green house gases emissions, production of waste, discharge of waste water, and other.

Impact of agriculture on air and global climate

Share of agriculture on total methane production is systematically falling, due to decreased number of livestock. In 2005, agriculture produced 52.6 thous. tons of methane.

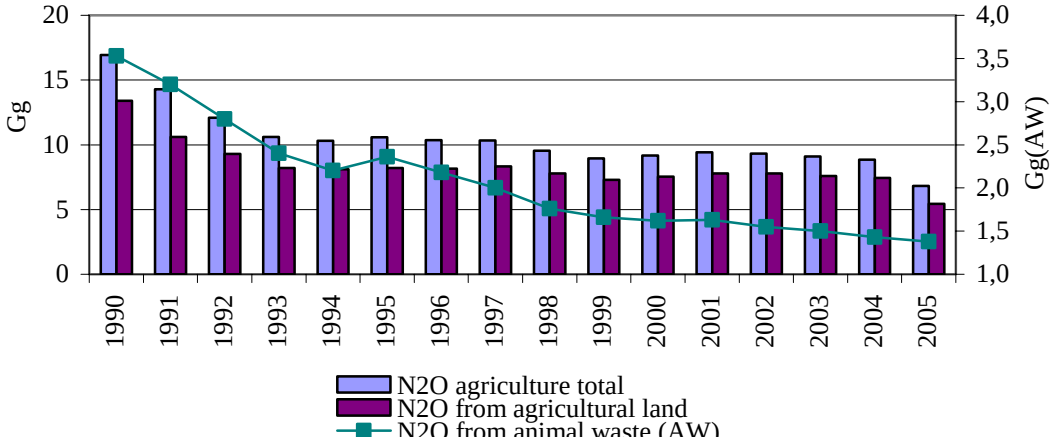
Trend in methane emissions from agriculture according to type of activity



Source SHMI

Production of nitrous oxide from agriculture is rapidly decreasing, due to a significant reduction in the use of fertilisers. In 2005, agriculture produced 6.8 thous. tons of nitrogen monoxide.

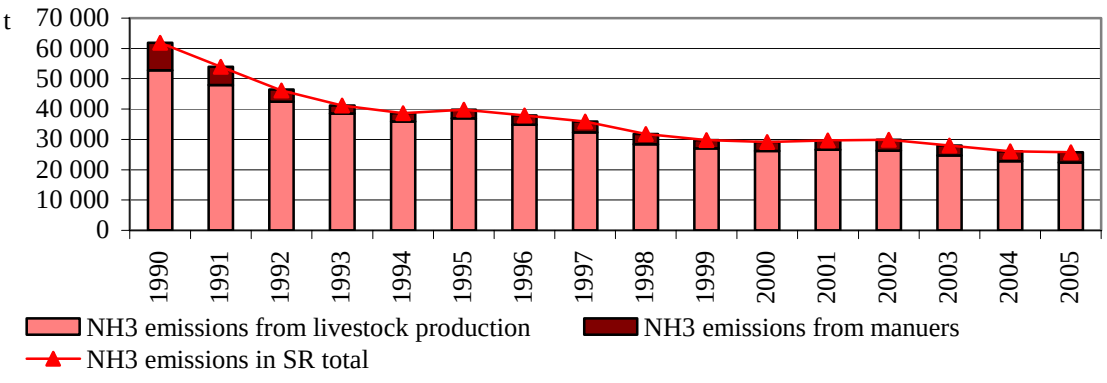
Trend in nitrogen monoxide emissions from agriculture according to type of activity



Source SHMI

Agriculture is the biggest producer of ammonia (NH_3). NH_3 emissions showed a falling tendency since 1990. Reduction in emissions from livestock production relates to a decreased rate of livestock raising.

Trend in ammonia emissions from agriculture



Source: SHMI

Impact of agriculture on water quality and quantity

In 2006, there was 470 386 m^3 of discharged wastewater related with agricultural activities.

Discharged amount of waste water in SR related to agriculture in 2006

Waste water from agriculture	Volume ($m^3.yr^{-1}$)	Insoluble compounds ($t.year^{-1}$)	BOD_5 ($t.year^{-1}$)	COD_{Cr} ($t.year^{-1}$)	ENP ($t.year^{-1}$)
Treated	110 286	7.303618	5.012538	22.47771	0.00675
Untreated	360 100	3.4762	4.0256	3.3497	0.22343
Total	470 386	10.77982	9.038138	25.82741	0.23018

Source: SHMI

Production of waste in agriculture

In 2006, there were 741 444.24 tons of total waste produced in agriculture, which is 80 376 tons more that in 2005. Of total produced waste other waste was 715 496.86 tons, which is 69 603.46 tons more than in 2005. Produced hazardous waste in 2006 was 25 947.38 tons of total waste volumes, which is 10 772.54 tons more than in 2005.

Forestry

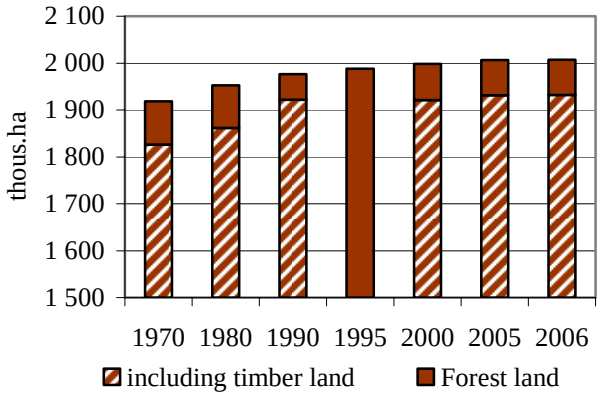
♦ **Share of forestry on GDP production**

GDP of forestry in 2006 was still influenced by the sale of left-over wood matter from the calamity of the Fall of 2004, reaching 8.5 bil. SKK, which is a 0.8 % share on the GDP generation (in fixed prices of 2000).

♦ **Structure of forest land**

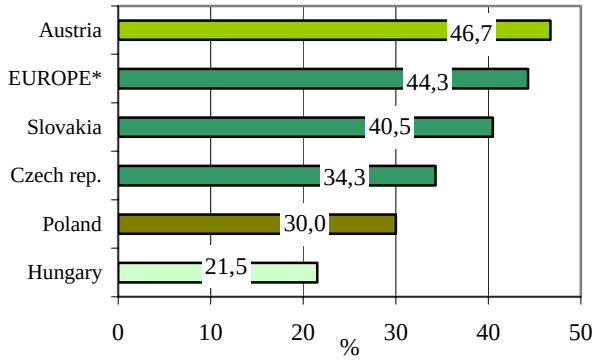
Slovak Republic belongs to the countries with the highest rate of **forestation. Forest land** in Slovakia in 2006 was about **41 %** (2 007 thous. ha) of total area of the state - there has been a long-term, continuous increase in their size. Timber land in 2006 represented app. 96.3 % (1 932 049 ha) of total size of forest land and similarly, there has been a gradual increase in its size. Calculated to the number of inhabitants, this represents **3.72 km^2 per 1 000 inhabitants.** Since 1950, size of forest land grew by 11.8 %, while the greatest increase in size was recorded between 1960-1970.

Trend in forest land and timber land



Source: NFC

Comparison of forestation in selected countries

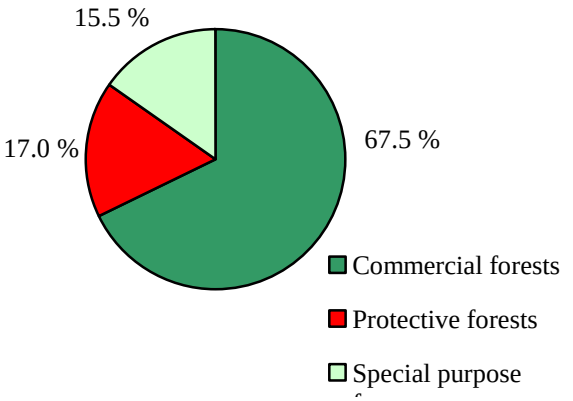


* – including Russian Federation;
Source: Global Forest Resources Assessment 2005

The forest ownership and utilisation settling process governed by the restitution legislation has not yet finished. This causes permanent changes to forest structure by ownership and utilization. **State** organisations of forest management **administer 56.1 % of forests,** which is 15 % more than in the state ownership. Forest land with no fully identified or documented ownership claims, or with no claims yet received from the entitled persons, take up **5.5 %** of total SR forest land.

Due to the increased demand for public benefit functions of forests, there is a systematic increase in the area of protective forests (from 7.9 % in 1960 to the present 17 %).

Spatial representation of forest categories in 2006



Source: NFC

Overview of area according to function – protective forests (PF) and special purpose forests (SPF) (2006)

Function - PF	% of PF
Erosion control	75.1
Water management	22.2
Deflation control	1.0
Avalanche control	1.4
Bank protective	0.3
Function - SPF	**% of SPF**
Water protective	4.4
Recreational	9.7
Health resort-therapeutic	1.1
Nature protection	15.4
Air pollutants control	37.7
Game management	7.4
Education-research	24.2

Source: NFC

♦ **Forest composition by species and age groups**

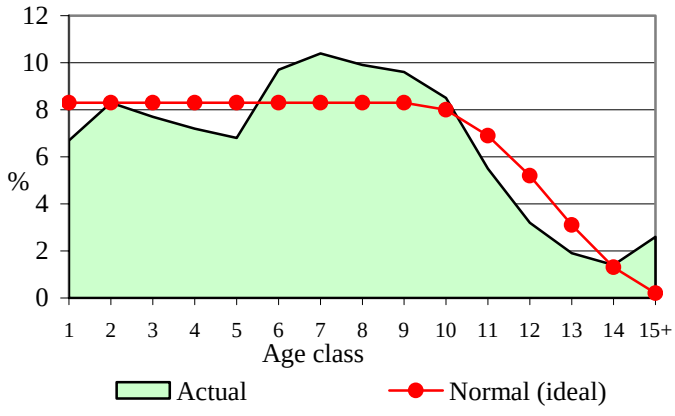
In terms of **forest composition by species**, there is a positive share of broad-leaved trees (59.2 %) compared to coniferous trees (40.8 %). There are **introduced tree types** commonly growing within broad-leaved tree vegetation areas. Their area has not increased over the recent decades (2.8 %), with the exception of *Robinia pseudoacacia.*

Comparison of present tree species composition in the forest of the SR with original and target-perspective one

Tree species	Tree species composition (%)		
	Original	Target - perspective	Actual (2006)
Spurce / Fir	4.9 / 14.1	18.2 / 6.7	26.1 / 4.0
Pine / Larch	0.7 / 0.1	4.2 / 6.7	7.2 / 2.4
Other coniferous	0.9	1.2	1.1
Coniferous together	**20.7**	**37.0**	**40.8**
Oak	19.9	17.7	13.4
Beech / Hornbeam	48.0 / 2.6	35.9 / 0.9	31.2 / 5.7
Maple /Ash	3.2 / 0.4	3.0 / 0.5	2.0 / 1.4
Robinia / Birch	- / 0.1	0.1 / 0.2	1.7 / 1.4
Elm / Alder	0.9 / 0.3	1.2 / 0.3	- / 0.8
Poplar / Willow	0.1 / 0.1	0.2 / 0.1	0.9 / -
Other broadleaved	3.7	2.9	0.7
Broadleaved together	**79.3**	**63.0**	**59.2**

Source: NFC

Age composition of the forest in 2006



Source: NFC

♦ **Forest transport network**

Average density of forest road network in Slovakia is 18.5 m.ha^{-1}, while the optimum density in our conditions fluctuates between 20 to 25 m.ha^{-1}. Length of outgoing forest roads in 2006 was **37 102 km**.

♦ Forestation and standing volume

In 2006, **15 561 ha were forested**, including 6 305 ha forested through **natural regeneration.** Share of natural regeneration has almost doubled since 1990 (currently, it represents 40.5 % of total forestation) and helps to enforce sustainable development practices in forests.

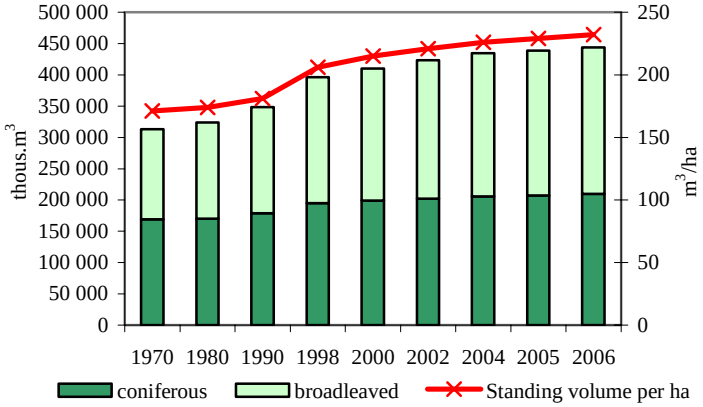
Standing volume in 2006 reached **443.8 mil. m^3** of barkless wood matter, with average stock per hectare reaching 232 m^3. Still increasing volume of wood stock is mainly influenced by the existing age composition of the Slovak forests, with abnormally high share of most-incremental medium age levels. **Total current increment** decreased since 1990 (through changes to the age composition) and is 11 671 thous. m^3. This trend may be considered linear since 2000.

Total standing volume in 2005-2006

Indicator	2005	2006
Standing volume together (thous. m^3 d_{bh}>7 cm under bark)	438 905	443 780
Of that: Coniferous	207 354	209 799
Broadleaved	231 551	233 981
Standing volume per ha (m^3)	229	232

Source: MoA SR

Trends in total standing volume



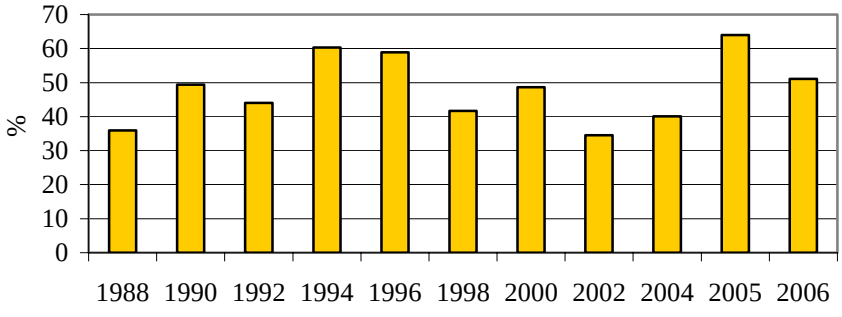
Source: NFC

♦ Timber felling

Timber felling in the Slovak forests shows an increasing tendency over a long range. In 2006, it was **8 357 thous. m^3**, including 5 150 thous. m^3 of coniferous timber. Since 1990, it has grown by 58.4 %. **Incidental felling** included **51.1 %** of total anticipated harvested timber (including 74.4 % of harvested coniferous trees), which significantly contributed to exceeding the anticipated harvested volumes by almost 19 %.

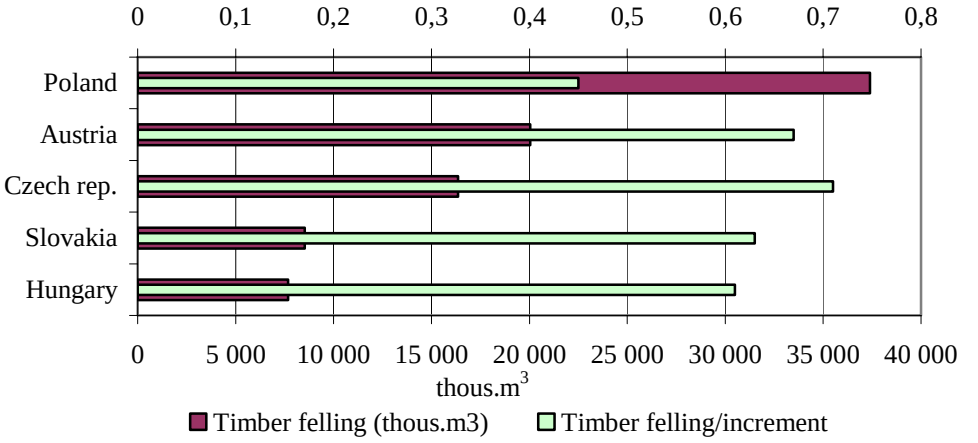
Natural conditions in the SR forests allow implementing the shelter wood system on about 70 % of timber land, selection harvest on about 10 %, and clear cutting on the remaining 30 % of timber land. **Intensity of forest resources utilisation** was as much as 71.6 % this year; however, it still points to the sustainable use of the SR forests (timber felling is lower than the annual increment).

Trend in share of incidental felling on total volume of timber felling in SR



Source: NFC

Comparison of utilisation of forest resources in selected countries

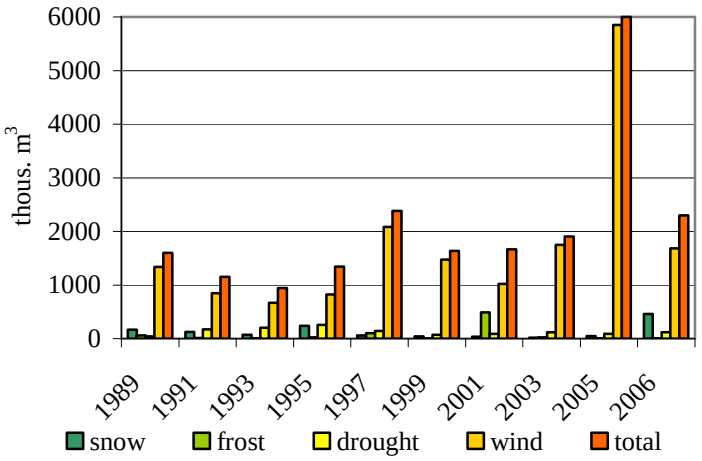


Source: UNECE/FAO (2000) and actualisation

♦ **Injurious agents and forests condition**

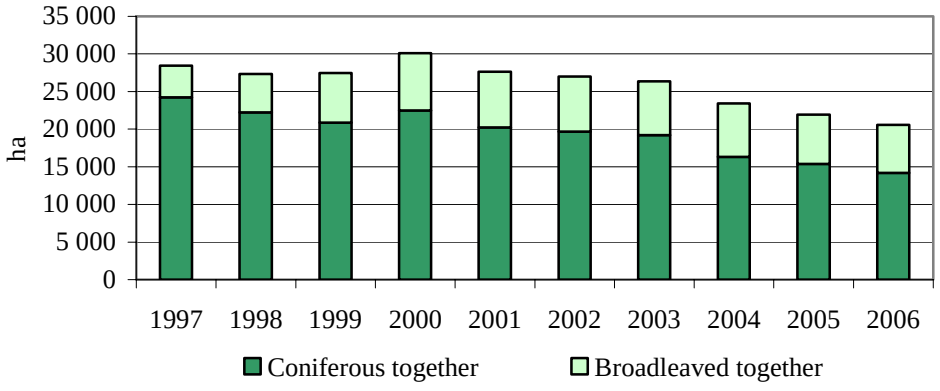
As a consequence of negative impacts of wind, snow, frost, drought, and unknown **abiotic factors,** there was **2 295.6 thous. m^3** of wood matter **processed** this year, with almost 73 % caused by the wind.

Trend in damages caused by abiotic agents



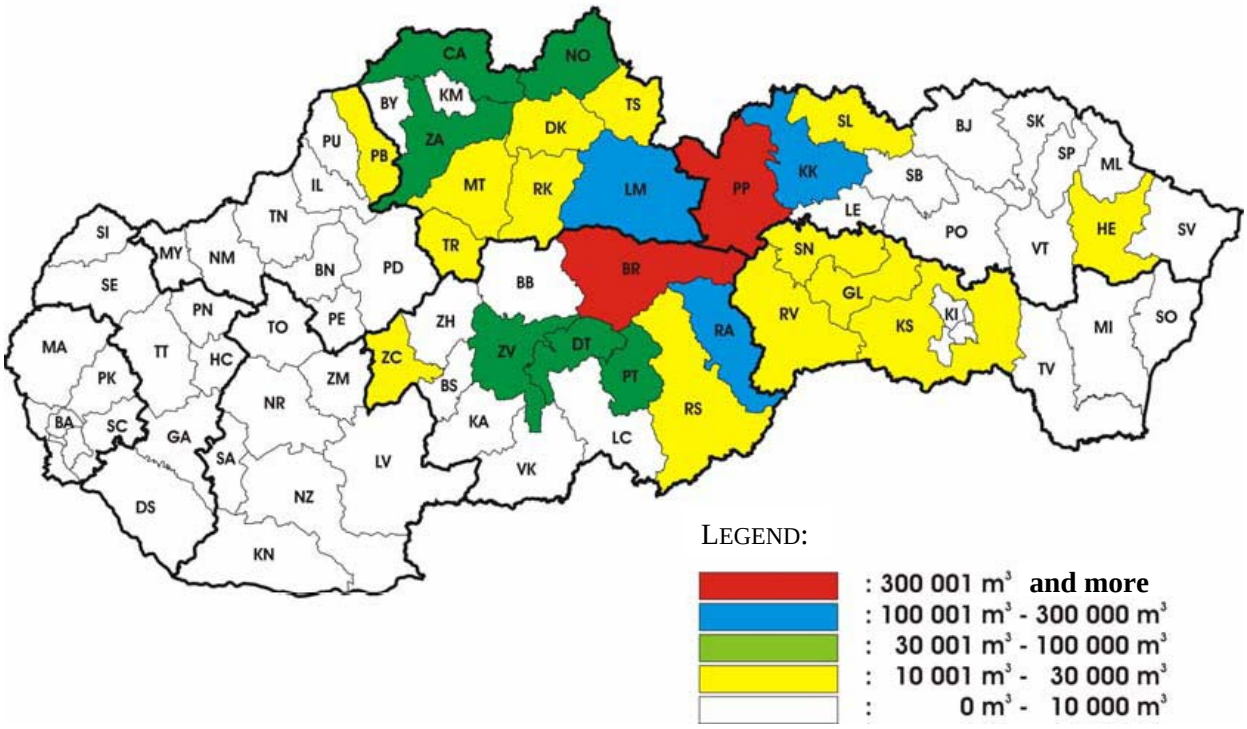
Source: NFC

Trend of the air pollution forest damage



Source: SO SR

Forest damage by wind and by SR districts in 2006



Source: NFC

Damage by air pollution was recorded on **20 565 ha** of forest land (including 52.6 % on spurce and 23.4 % on beech). Districts of Gelnica, Kežmarok, and Spišská Nová Ves show the most adverse situation.

In 2006, there were **237 forest fires** in Slovakia. In 55 % of cases, the cause behind fires was manipulation with open fire, arson (20 %), uncontrolled burning of waste (10 %), unknown cause (5 %), and other (5 %).

In 2006, the greatest invasion of vegetation by **bark beetles and woodworms** was recorded (as much as 1 344.2 thous. m^3) with 1 185 thous. m^3 processed. *Ips typographus* is the major harmful insect, attacking 1 183.5 thous. m^3 of wood matter. Most damaging of the **leave-eating and sucking insects** impacting the broad-leaf trees was *Lymantria dispar*, with its culmination point already passed. Significant reduction in its numbers is therefore anticipated. Numbers of *Dreyfusia*

nordmannianae sp. increased in 2006, with its regular occurrence on young fir trees in mountainous regions. Since the years 2000/2001, *Adelges laricis* and *Sacchiphantes viridis* on young larch trees and spruce trees represent a serious problem.

Armillaria ostoyae, that is becoming a major harmful agent especially in spruce vegetations on acidic substrates in Kysuce, Orava, the sub-Tatras regions, and in Spiš, are the major harmful **phyto-patogenic micro-organisms.** From the economy aspect, **wood-eating fungi** cause major damage (especially root and trunk rottenness). Spruce belongs to the most affected tree type, followed by fir, beech and pine.

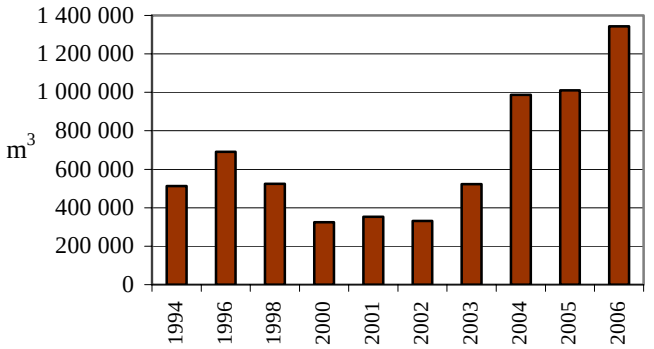
Total recorded damage caused by **game** was 9 160 thous. SKK. Since 1991, (24 501 thous. SKK) they have had a falling tendency, reaching their minimum in 1999 (6 262 thous. Sk) and beginning to grow again since 1999. Risks of forest vegetation damaged by game are increasing.

The volume of damages caused by biotic injurious agents in 2006

Phytopathogenic microorganisms	299 022 m^3
Rots and tracheomycosis	45 972 m^3
Leaf-eating and sucking insects	9 441 ha
Bark beetles a wood borers	1 185 100 m^3
Game	891 ha

Source: NFC

Trend of damages caused by bark beetles and wood borers



Source: NFC

♦ **Forest condition monitoring and assessment**

National programme of **forest ecosystems health condition monitoring** was implemented also in 2006. The programme operated 112 permanent monitoring areas (PMA) within the 16x16 km network (extensive monitoring), and 7 research PMAs (intensive monitoring). Both monitoring levels are part of the European network of monitoring areas within the UN/ECE ICP Forest Programme.

Ratio of trees **in the 2-4 degrees of damage** is the determining factor for assessment of deterioration or improvement to the health condition of forests. The year 1989 is considered most critical, when as much as 49 % of trees were classified into degrees of damage 2-4.

Results of forest condition monitoring in SR in 1987-2006

Year	Tree types	Representation of trees in various damage degrees in %							
		0	1	2	3	4	1-4	2-4	3-4
1987	Coniferous	11	36	41	11	1	89	53	12
	Broadleaves	26	47	22	5	0	74	27	5
	Total	19	42	32	7	0	81	39	7
1996	Coniferous	12	47	37	2	2	88	41	4
	Broadleaves	15	57	26	1	1	85	28	2
	Total	13	53	30	2	2	87	34	4
1998	Coniferous	16	44	36	4	0	84	40	4

	Broadleaves	27	46	25	2	0	73	27	2
	Total	22	46	29	3	0	78	32	3
2000	Coniferous	18	44	35	2	1	82	38	3
	Broadleaves	29	57	13	1	0	71	14	1
	Total	25	52	22	1	0	75	23	1
2002	Coniferous	8	51	38	2	0	92	40	3
	Broadleaves	23	62	14	1	0	79	15	1
	Total	17	58	23	1	0	83	25	2
2004	Coniferous	4	60	35	1	0	96	36	1
	Broadleaves	16	64	19	1	0	84	20	1
	Total	11	62	26	1	0	89	27	1
2005	Coniferous	6	59	33	2	0	94	35	2
	Broadleaves	21	65	13	1	0	79	14	1
	Total	14	63	22	1	0	86	23	1
2006	Coniferous	5	53	41	1	0	95	42	1
	Broadleaves	21	62	16	1	0	79	17	1
	Total	14	58	27	1	0	86	28	1

Description of damage degrees of monitored trees: Source: NFC

0 - defoliation of trees between 0 - 10 % no defoliation (healthy trees)
1 - defoliation of trees between 11 - 25 % slight defoliation (slightly injured trees)
2 - defoliation of trees between 26 - 60 % medium defoliation (medium injured trees)
3 - defoliation of trees between 61 - 99 % strong defoliation (strongly injured trees)
4 - defoliation of trees between 100 % dying and dead

Major knowledges reached in 2006:

- Of total number of 3 975 monitored trees in 2006, 28.1 % were damaged, i.e. with defoliation exceeding 25 % (degrees of defoliation 2-4).
- A worse situation exists with the coniferous trees, with 42.4 % of damage trees, while only 17 % of the broad-leaf trees are damaged.
- Average defoliation of all tree types together in 2006 is 23.1 %, including 27.4 % of coniferous, and 19.7 % of broad-leaf.
- In 2006, health condition of broad-leaf trees worsened, compared to 2005.
- Health condition of coniferous trees has been **stabilised** since 1996, in case of broad-leave trees, the situation shows more fluctuations between individual years.
- On the basis of the number of trees classified into the damage degrees of 2-4, health condition is worse than the whole-European average, caused mainly by worse health condition of coniferous trees.
- The least-defoliated tree types are hornbeam and beech. In long term, tree types with the greatest level of defoliation are fir and spruce.
- Compared to 2005, in 2006, improved health condition measured by defoliation was observed only in oak. Fir, hornbeam and ash showed the most significant increase in average defoliation.
- Orava, Kysuce, and Spiš-Tatras area belong to the areas with the worst long-term health condition of forest, partially also the Acacia vegetation of the south of Slovakia.
- As much as 85.5 % of the monitored trees showed at least one sign of damage by harmful agents. Only 10.3 % of trees showed no signs of damage. Most frequent sites of damage included the root bases and trunks, with as much as 69 % of trees damaged, especially mechanically damaged trees due to harvesting activities.

Monitoring of forests and environmental interactions – intensive monitoring of forests (for the year 2005):

- Compared to 2001, sulphur deposition in the SR forests in 2005 dropped by 40-50 % on average.
- All monitored forests since 1999 have shown a significant decrease in sulphate anion concentration in rainfalls, with a subsequent slight increase in the pH value.
- Total nitrogen deposition was higher than sulphur deposition at all monitored areas, both in open area, as well as in forestland. The trend started last year only proves that the acidification and eutrophication impacts of nitrogen gradually play a key role in relation to the health condition of forest vegetation.
- Ozone concentrations in the monirored territories in 2005 showed a typical annual trend, while the critical AOT 40 index level (set at 10 000 ppb.h for forest ecosystems) was exceeded in all monitored territories. The mentioned value was regularly exceeded in higher altitudes as early as in the first half of the vegetation season.

Results of tree defoliation in selected European countries in 2004

Country	Number of assessed trees	Degree of injury				
		0	1	2	3+4	2+3+4
Czech Republic	6 585	11.7	31.0	56.2	1.1	57.3
Hungary	28 313	39.9	38.6	15.6	5.9	21.5
Poland	25 520	8.3	57.1	32.5	2.1	34.6
Austria	3 582	51.4	35.4	10.4	2.8	13.1
Slovakia	**4 216**	**11.3**	**62.0**	**25.7**	**1.0**	**26.7**

Source: MoA SR

♦ **Hunting**

There were **1 818 hunting areas** in Slovakia in 2006, including 30 game protection territories and 12 pheasant territories. Total size of the hunting territory is **4 414 407 ha**. There is 2 314 thous. ha of agricultural land, 1 972 thous. ha of forest land, 53 thous. ha of aquatic, and 75 thous. ha of other land. Number of hunting areas is increasing, while their average size is decreasing.

Spring stock of the cloven-hoofed game excluding the fallow dear game as of March 31, 2006 were higher than in the previous year.

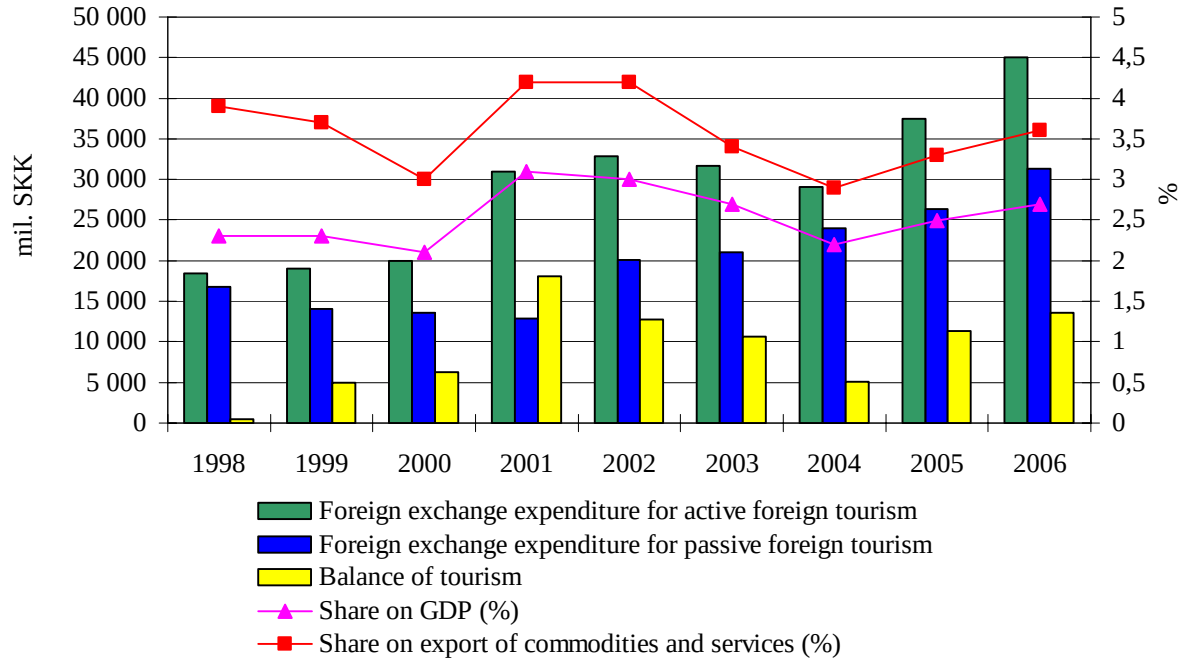
Shooting of **deer** in 2006 was higher than in the previous year; however, the planned shooting quota was not reached. Shooting of fallow **deer, mouflon and boar game** decreased. Spring stock of pheasant and brown hare increased. On the other hand, spring stock of small game dropped. In terms of other **rare species** of animals, compared to the previous year, their numbers increased, excluding wild goose. Hunting of rare game species is strictly regulated. Permitted shooting limit of **bear** was 63, while the actual number of shot animals was 16. 91 wolves and 8 alpine chamois were shot. A significantly higher number of chamois (665) was recorded than in the previous year (625).

Recreation and tourism

♦ Tourism and its contribution to the GDP

Notwithstanding their fluctuating characteristics, **foreign exchange revenues for active tourism balance in 1997-2002 were on the rise**; however, during the period of 2002-2004, there was a **reduction,** caused by major changes outside the sector (strengthening of the Slovak currency conversion rate, especially relating to the US dollar and Polish zloty, increased original VAT tax rate from 14 to 19 %). **There was again a very significant increase in revenues from tourism and their share on the GDP and export of goods and services in 2005-2006.**

Tourism and its share on GDP and export between 1998-2006



Source: SO SR

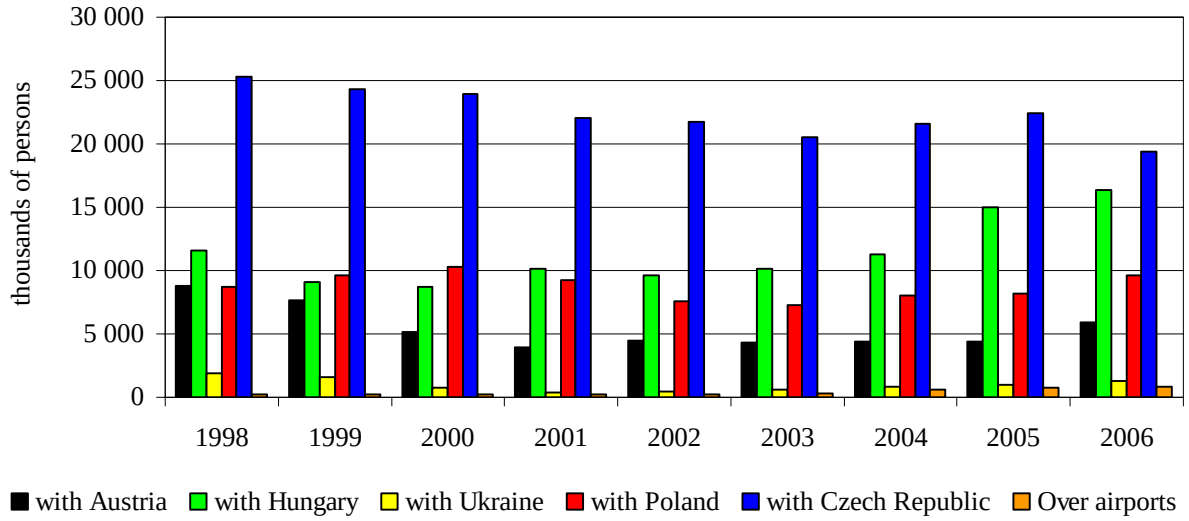
* - level of revenues in foreign exchange in 2001 is partially affected by transition to EUR toward the end of the year and the SR citizens placing foreign exchange on their foreign exchange accounts

♦ Specific analysis of recreation and tourism

In 2006, no selection statistical survey was implemented in the area of active international tourism, neither was there any survey on leisure activities of the Slovak inhabitants. For this reason it is not possible to provide any information on motivational factors of international visitors to Slovakia for the year 2006.

Overall number of visits of international tourists and the number of visits made by the Slovaks in the period of 1997-2003, despite a significant fluctuation, **was falling. The trend was turned over in 2004, with a very mild, continuing growth also in the period of 2005-2006.** The most heavily loaded territory is the national border of Slovakia and the Czech Republic. On the other hand, the least loaded is the Slovak-Ukranian national border, despite a recorded significant growth in 2001-2006.

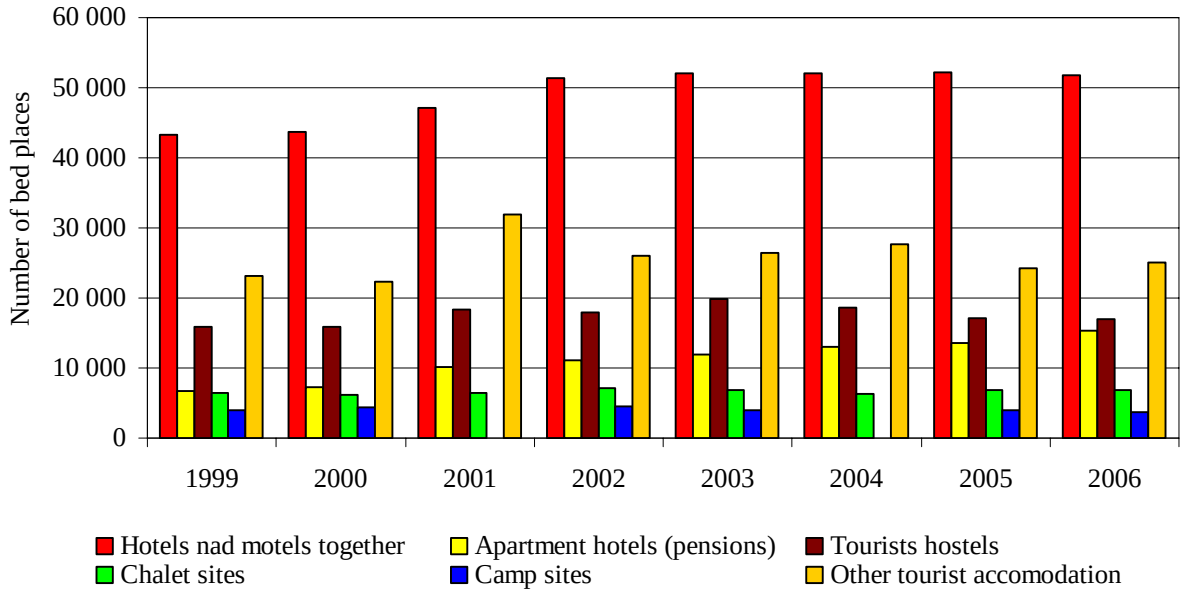
Foreign tourism by loaded territories of national borders (%) between 1998-2006



Source: SO SR

Increase in the bed capacity of accommodation facilities in 1998-2003 can be assessed positively as this increase has been caused especially by increase in the number of more affordable, small environment friendly accommodation facilities – pensions and hostels. **In 2004-2006,** this positive trend stopped, while today there is **stagnation in the number of beds** in all categories of accommodation facilities.

Capacity of tourism accommodation (number of bed places) in Slovak Republic between 1999-2006

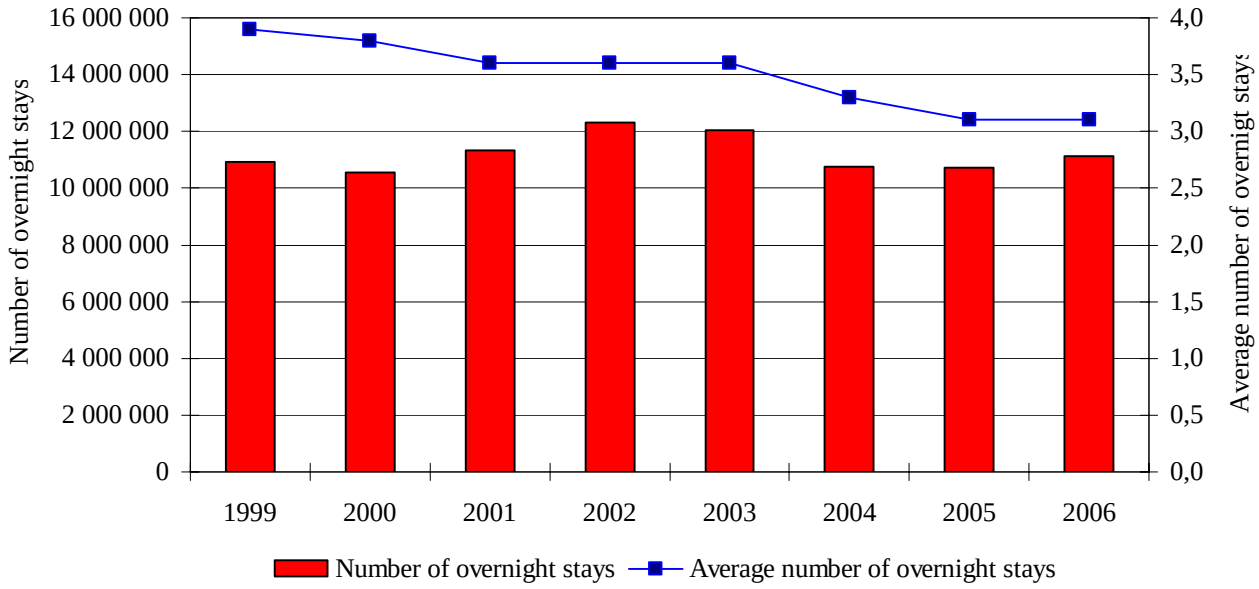


Source: SO SR

Notwithstanding the fluctuating characteristics of statistical data, **number of overnight stays** is still stagnating. Most importantly; however, **average number of overnight stays** decreases

continually. This relates to the attractiveness of the tourist destination and the level of development of its infrastructure. This is what influences the length of actual stays.

Overnight stays in tourism accommodation between 1999-2006



Source: SO SR

♦ **Demand of tourism on exploitation of resources**

In terms of national economy, **tourism with its little demand on material resources does not represent a significant demanding sector.** This fact is especially important for a country like Slovakia that depends much on export. **Demand of tourism on the exploitation of natural resources and land occupation** is **important especially on the local** level. This phenomenon is caused by major seasonal differences in the number of tourists to individual tourist destinations. Compared to other economic activities, it is not possible, for example, to supply data on the energy and material demand of tourism, because of the lack of good data retrieving and collecting mechanisms to meet specific indicators.

♦ **Environmental impact of recreation and tourism**

Intensity of tourist visits is not regularly spatially distributed. Sites for mountain tourism activities are concentrated within The Tatranský National Park (Roháčska valley in the West Tatras, and Mlynická, Mengusovská, Velická, Malá, Veľká Studená, and Skalnatá valleys), The Nízke Tatry National Park (Demänovská and Jánska valleys, and northern slopes of Chopok, Bystrá valley, and southern slopes of Chopok), and The Malá Fatra National Park (Vrátna valley).

Especially by inclusion of territories of new national parks – The Slovenský kras National Park and The Veľká Fatra National Park since 2002, there has been **increase in distance of marked cycling trails and marked hiking trails** on the territory on national parks. In terms of density of such marked

tourist trails, the most fragmented territories, in terms of their size, are areas of The Pieniny National Park, The Muránska planina National Park and The Slovenský raj National Park.

Number of locations for so called active sports in national parks behind the border of municipal construction zones (§14, part 1, letter b, c, d) of the Act No. 543/2002 Coll. on Nature and Landscape Protection between 2001-2006

Name of protected area	Mountain cilimbing and rock climbing	Skialpi-nism	Camping, bivouac	Ski areas	Cross country skiing **	Bicycle marked paths **	Hiking marked paths **
♦ **The Tatranský National Park**							
2001	whole area*	6				150/0.20	600/0.81
2002	whole area*	6				150/0.20	360/0.49
2003	whole area*	6	1	7	108/0.14	150/0.20	690/0.93
2004	whole area*	6	1	7	108/0.14	150/0.20	690/0.93
2005	whole area*	6	1	7	108/0.14	150/0.20	690/0.93
2006	whole area*	6	1	7	108/0.14	150/0.20	690/0.93
♦ **The Nízke Tatry National Park**							
2001	4	1				201/0.25	800/0.98
2002	4	1				201/0.25	800/0.98
2003	4	1	6	6		201/0.25	800/0.98
2004	4	6 (3 areas, 2 trails, 1 locality)	7	6	40 + suitable marked hiking paths	718/0.39 (include protective area of the national park)	800/0.44 (include protective area of the national park)
2005	4	6 (3 areas, 2 trails, 1 locality)	7	6	40 + suitable marked hiking paths	718/0.39 (include protective area of the national park)	800/0.44 (include protective area of the national park)
2006	4	6 (3 areas, 2 trails, 1 locality)	7	6	40 + suitable marked hiking paths	718/0.39 (include protective area of the national park)	800/0.44 (include protective area of the national park)
♦ **The Malá Fatra National Park**							
2001	1	1				0	157/0.69
2002	1	1				0	157/0.69
2003	1	1		2		0	157/0.69
2004	1	1	-	2	-	-	157/0.69
2005	5	-	4	2	15 + 157 km of marked hiking paths	35/0,15	157/0.69
2006	5	-	4	2	15 + 157 km of marked hiking paths	35/0,15	157/0.69
♦ **The Pieninský National Park**							
2001	0	0				15/0.4	60/1.6
2002	0	0				15/0.4	60/1.6

2003	0	0	2	1	9	15/0.4	60/1.6
2004	-	-	1	1	9	15/0.4	60/1.6
2005	-	-	2	1	22	15/0.4	60/1.6
2006	-	-	2	1	22	15/0.4	60/1.6
♦ **The Slovenský raj National Park**							
2001	1	0	3	5	1	60/0.3	275/1.39
2002	1	0	3	5	1	44,5/0.2	215/1.09
2003	5***	0	3	5	1	44,5/0.2	215/1.09
2004	5***	-	3	5	1	44,5/0.2	215/1.09
2005	5**	-	3	7	50 + suitable marked hiking paths (include protective area of the national park)	118,5/0.1 (include protective area of the national park)	215/1.09
2006	5**	-	3	7	50 + suitable marked hiking paths (include protective area of the national park)	118,5/0.1 (include protective area of the national park)	215/1.09
♦ **The Muránska planina National Park**							
2001	3	0				0	318/1.57
2002	1	0				0	318/1.57
2003	1	0				0	318/1.57
2004	2	0	3	0	26	13/0.06	318/1.57
2005	2	-	3	-	26	13/0.06	318/1.57
2006	2	-	3	-	26	13/0.06	318/1.57
♦ **The Poloniny National Park**							
2001	0	0				0	119/0.4
2002	0	0				0	119/0.4
2003	0	0	2	1	0	0	119/0.4
2004	0	0	2	1	0	0	119/0.4
2005	-	-	2	1	119/0,4	44	119/0.4
2006	-	-	2	1	119/0,4	44	119/0.4
♦ **The Slovenský kras National Park******							
2001							
2002	1	0				38/0.19	270/0.78
2003	1	0				38/0.19	270/0.78
2004	1	0				38/0.19	270/0.78
2005	1	-	-	-	-	38/0.19	270/0.78
2006	1	-	5	-	-	38/0.19	270/0.78
♦ **The Velka Fatra National Park******							
2001	3	0				100/0.25	200/0.5
2002	3	0				100/0.25	200/0.5
2003	3	0	0	3	0	100/0.25	299/0.74
2004	5			3		100/0.25	299/0.74
2005	8	1	6	3	300/0,74	103/0.26	300/0.74
2006	8	1	6	3	302/0,75	103/0,26	302/0,75
♦ **Together**							
2001						**526/0.16**	**2 529/0.8**

2002	**9 + The Tatranský National Park**	**8**				**548/0.17**	**2 499/0.79**
2003	**15 + The Tatranský National Park**	**8**	**14**	**25**	**118**	**548/0.17**	**2 928/0.92**
2004	**18 + The Tatranský National Park**	**13**	**17**	**25**	**184 + The Nízke Tatry National park**	**1 078.5 km**	**2 928 km**
2005	**25 + The Tatranský National Park**	**13**	**28**	**27**	**680 + suitable marked hiking paths**	**1 234,5**	**2 929 km**
2006	**26 + The Tatranský National Park**	**13**	**33**	**27**	**682 + suitable marked hiking paths**	**1 244,5**	**2 931 km**

Source: SNC SR

* - except for 8 localities defined in the Visiting order of national park, where climbing is forbidden
** - in case of cross country skiing, cyclo-tourism and hiking, information is available on length of the marked tracks, marked bicycle paths and of the marked hiking paths in km or in km/km^2.
***- include climbing the ice falls
**** - Slovenský kras a Velká Fatra were declared national parks in 2002

Increase in length of erosion-impacted tourist marked trails presents a significant environmental issue. These trails are in the zone above the upper forest border and in precipices where, due to extreme climate conditions, exist greatly deteriorated local conditions for regeneration of soil and the flora. **Critical soil erosion** may be seen at marked tourist trails **in the territory of The Nízke Tatry National Park, The Malá Fatra National Park** (substantial erosion increase over the years 2002-2003), and **The Muránska planina National Park** (substantial erosion increase over the years 2004-2005). **Significant erosion** exists also **in the territory of The Slovenský raj National Park**. In 2004-2005, **significant increase in erosion of marked tourist trails was recorded** also in the territory of the **The Tatranský National Park**.

Soil erosion on documented tourist hiking trails and cyclotrails in the territories of national parks between 2001-2006

Year	Overall length of the marked bicycle paths affected by erosion (km/% of the total length)	Overall length of the marked hiking paths affected by erosion (km/% of the total length)
2001	2/0.38	576/22.7
2002	7.5/1.37	630/25.2
2003	12/2.19	732/25.0
2004	13.8/1.3	778/26.6
2005	17/1.5	878/30.0
2006	15/1,4	883/30,1

Source: SNC SR

Highest degree of endangerment of small-size protected areas from tourism exists in the following territories: The Tatranský National Park, The Nízke Tatry National Park, The Malá Fatra National Park, The Pieniny National Park, The Slovenský raj National park, The Malé Karpaty Protected Landscape Area, The Strážovské vrchy Protected Landscape Area, The Poľana Protected Landscape Area and The Vihorlat Landscape Area.

Healthy conditions of living and working conditions shall be created and secured by conservation of air, water, land and other elements of environment...

§13a of the Act No. 272/1994 Coll. on Protection of Human Health as subsequently amended

• PUBLIC HEALTH

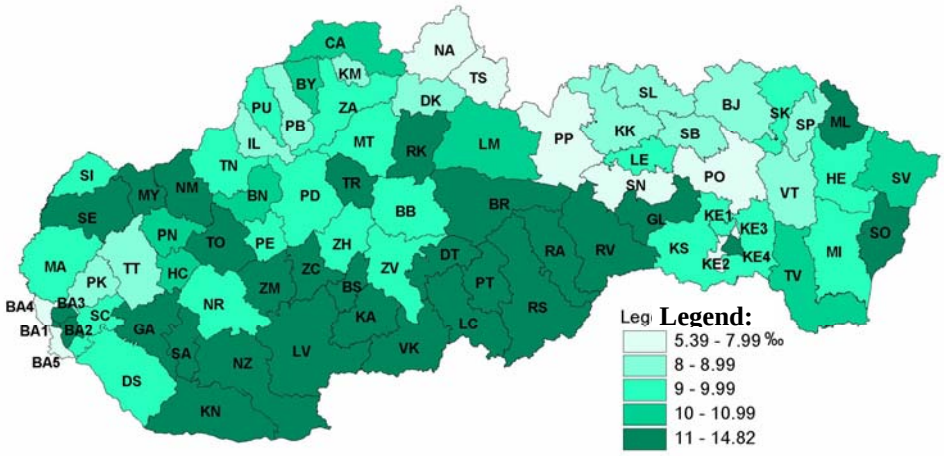
Life expectancy at birth

Average life expectancy at birth is rising for both genders, reaching 70.4 years for men and 78.2 years for women in 2006. Compared to 2005, average age of the living Slovak population increased and reached the level of 36.1 years in men, and 39.3 years in women. Despite this positive trend, Slovakia belongs to the 5 EU countries (Baltic States, Hungary, Slovakia) with the lowest average life expectancy for both men and women.

Morbidity and mortality

In 2006, there were 28 091 deaths for men and 25 210 deaths for women. Compared to 2005, this is lower by 60 deaths in men, and 114 deaths in women.

Number of dead in 1 000 inhabitants according to districts in 2006



Source: SO SR

Greatest public mortality both in men and women over a long time period has been from **circulatory system diseases**, with 29 297 deaths, which is 48.2 % in men and 62.5 % in women. Second most frequent cause of death for both, men and women, are still **neoplasms.** Compared to the last year, cancer shows a slightly decreasing tendency, with 11 732 deaths in 2006, which is 24.3 % of men and 19.5 % of women. In men, third most frequent cause of death is **injuries and poisonings** (8.7 %). In women, the third most frequent cause of death includes **respiratory diseases** with a slight reuction, compared with the last year (5.1 %).

Public Health – selected indicators

Indicator	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Life expectancy at birth										
• Men	68.9	68.6	68.95	69.15	69.51	69.77	69.76	70.29	70.1	70.4
• Women	76.7	76.8	77.03	77.23	77.54	77.57	77.62	77.82	77.9	78.2
Live births per 1 000 inhabitants	11.0	10.7	10.4	10.2	9.5	9.5	9.6	10.0	10.1	10.0
Deaths within 1 year of age per 1 000 live births	8.7	8.8	8.3	8.6	6.2	7.6	7.8	6.8	7.2	6.59
Infant mortality rates	5.4	5.4	5.1	5.4	4.1	4.7	4.5	3.9	4.1	3.53
Deaths	52 124	53 156	52 402	52 724	51 980	51 532	52 230	51 852	53 475	53 301
Deaths per 1 000 inhabitants	9.7	9.9	9.7	9.9	9.7	9.6	9.7	9.6	9.9	9.89

Source: SO SR

The Slovak Government in its Resolution No.10 of January 11, 2006, adopted the third revised Action plan for environment and public health for the SR (NEHAP III) with the objective to minimize the risks posed by environment, and maintain the environment in such a state that it does not damage the health of people, but ensures its positive trend. NEHAP III includes four priority areas:

1. **Action plan for environment and child health – 4 regional priority objectives**
2. **Human bio-monitoring**
3. **Information system of environment and health**
4. **Climate changes and health.**